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[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION,
OFFICE OF EDITOR, WRINKLE DEPARTMENT,
MILWAUKEE, WIS., Oct. 25, 1905.

To the Members of the Western Gas Association: The next meeting of the Western Gas Association will in all probability be the last one, owing to the proposed merging of the three leading gas associations. Therefore, every effort should be made to make it a rousing success in all respects, and it falls to my lot as Editor of the Wrinkle Department to again appeal to you for this department. I earnestly request those who have made promises of contributions to remember such as soon as possible, and I fully expect to hear from quite a number who have not made any promises, but who I know are in possession of something that would prove of value to the Wrinkle Department.

Yours very truly, B. MCADAM, Editor.

[NOTICE.]

Wrinkle Department, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF THE WRINKLE DEPT.,
719 CITIZENS BUILDING,
CLEVELAND, O., June 13, 1905.

The Wrinkle Department of the Ohio Gas Light Association is now ready to receive contributions for the 1906 collection, and a sketch or description of all devices, formulæ and methods of accomplishing objects pertaining to the gas business, is respectfully solicited.

Please send a written explanation, accompanied by any sketch, photograph or drawing, to the above address, or a description alone will suffice.

Hoping to receive prompt compliance,

Yours very truly, W. E. STEINWEDELL, Editor.

BRIEFLY TOLD.

A REPORT AND ITS CONSEQUENCES.—The voluminous report of the expert appointed to examine and advise on the condition of the municipal gas plant at Richmond, Va., has only recently been made public, though it was submitted to the Committee on the 1st of September, this year. A large part of it consists of an open and indiscriminate scolding of everything and everyone connected with the management of the works, and a thinly veiled scoriation of municipal ownership in general. The omission of many figures relating to the operation of the plant (though probably known to the Committee) makes the report of less general interest than it otherwise would be. Neither the present price of gas nor the output and sales is given, and no mention is made of the past yearly increases nor of the probable future growth. Other sources of information give the price as $1 for light and fuel and last year's output as 373 million feet, which for an estimated population of 95,000, is nearly 4,000 feet of output per head. The unaccounted-for

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gas is stated to be 13 or 14 per cent., but is based partly on estimate. Statements of percentage leakage have little bearing on the question of the operation of a works from an engineering standpoint, as sales per mile of main will vary this figure without in any way altering the actual condition of the mains and services. Dividing the unaccounted-for gas by the mileage of mains gives 590,000 feet per year, which is certainly high, but is not unheard of, even among private corporations. The most interesting part of the report is that relating to the cost of gas, which is also partly estimated. After adding $30,000 a year for money which ought to have been expended but was not, and also 4½ cents per 1,000 cubic feet for taxation which was not charged, and including interest on the 4 per cent. bonds issued by the city to pay for the gas works, the total cost is 99.58 cents per 1,000 cubic feet sold, showing a surplus of nearly half a cent after paying all capital and other charges. It is recommended that $709,000 be expended at once for extensions and improvements, and the suggestion is made that the municipal operation has run the works into a hole to this extent, but $300,000 of this amount ($30,000 per year) is charged in the estimated figures of cost, leaving apparently about $409,000 required for extensions which ought not and cannot be taken from earnings, but should be provided by new capital. The inadequacy of the supply and the dissatisfaction of the consumers are touched on in a general way, but these are common complaints everywhere, and we even have them in Brooklyn, N. Y. Many instances of bad management are mentioned and there is little doubt that a private company with fair management could make twice as much profit out of the investment as the city does, or 8 per cent. instead of 4 per cent. But the question of most interest to the consumers of Richmond is how much of this extra 4 per cent, if any, would get into their pockets? The future of this works is all before it, and if the city will run it on business lines a large profit can be made, but the existing price is probably as low as the consumer would get under private management. The whole tone of the report seems to be unnecessarily alarming, but we hope that the city will not become so panic stricken as to throw overboard the entire gas plant, without looking for finny creatures following in the wake to gobble up any of the jettisoned cargo. That there is such a thing as trying to make out too strong a case, we all well know.

NOTES—

MR H. MONTE COLLIN, a former resident of Utica, N. Y., has been chosen Secretary and Superintendent of the United Gas, Electric Light and Fuel Company, of Sandy Hill, N. Y.

WORK has been commenced on the construction of the plant of the Tiverton (Mass.) Gas Illuminating Company.

ON the 6th inst. several "prominent residents" of Glassboro, N. J., met and discussed the project of a gas supply for Glassboro and the adjoining hamlets of Clayton and Pitman Grove. There is good reason for believing that the scheme will be carried out.

THE Allentown (Pa.) Gas Company is comfortably settled in its handsome, new office quarters in the Commonwealth Building, 514 to 518 Hamilton street. Superintendent Bigelow hopes that every gas man who has occasion to visit Allentown, no matter what the object of such visit is, will look over his "quarters," which certainly are of the royal sort.

MR. E. A. PINKNEY has been appointed Superintendent of the Pintsch plant at Nashville, Tenn.

MESSRS. P. C. THOMPSON, F. A. Platt, Ralph L. Aldrich and A. E. F. White, of Detroit, have purchased the plants and franchises of the Red Wing (Minn.) Gas and Electric Company. Mr. W. R. Putnam is to be retained as Manager, and it is estimated that the cost of the betterments as planned will not be less than $40,000.

MR. S. E. WOLFF has resigned the position of General Manager of the Jackson (Mich.) Gas Company, to accept the place of General Manager of the Saginaw-Bay City Railway and Lighting Companies. He succeeds Mr. Bernard C. Cobb, who joins the New York firm of Hodenpyle and Wallridge, 7 Wall street, the 1st of January Mr. Cobb still continues to hold the office of Vice-President of the Saginaw Company.

THE gas works for Washington, N. J., will be built next spring. The title of the Company is the Washington Gas Company and its officers are: President and Agent, Daniel V. Wyckoff; Vice-President, John S. Ackerman; Secretary, William Allegar; Treasurer, J. R. Bryant.

THE Inner Harbor Gas and Electric Company, to carry on business in Inner Harbor, Cal., has been incorporated.

[ABSTRACT—Continued from Page 927.]

PROCEEDINGS, THIRTY-THIRD ANNUAL MEETING, AMERICAN GAS LIGHT ASSOCIATION.

HELD IN THE HOTEL PFISTER, MILWAUKEE, WIS., OCTOBER 18-20, 1905.

FIRST DAY—AFTERNOON SESSION.

The President called the meeting to order at 2:30 o'clock.

REPORT OF COMMITTEE ON ELECTROLYSIS.

The President called for a report from the Committee on Electrolysis, which Mr. A. G. Glasgow presented as follows: The Committee on Electrolysis, after three very hard and strenuous years of effort, has about reached a point where it is ready to submit its report. As this report is very lengthy it would be practically impossible to read it at this time, and there are still some matters unfinished in connection with it. What we wish to do is to indicate to you as briefly as possible the form the report will take and obtain a resolution authorizing us to have it printed and circulated to the members and submitted for their approval at the next meeting. I wish to say on behalf of the committee we should be very glad to receive any suggestions of criticism or recommendation that may occur to any member, give them prayerful consideration, and if deemed advisable will adopt them. I will read a skeleton form of the report and also a couple of its pages, so that you may be able to judge whether it is worth having it printed or not. If you elect to authorize us to print it and circulate it, we will do it about the end of the year. [Reads from report.] That is all I need trouble you with at present. We have our 5 sections practically completed, which will be embodied in a report, the beginning of which I have just read to you, and if any member cares to propose a resolution that this committee be authorized to print and circulate this report as soon as ready, subject to the criticism of the members, and subject to acceptance by the Association at its next meeting, we shall undertake the work and have it ready.

Mr. McDonald (Louisville) moved that the committee be authorized to print the report and circulate it. (Carried.)

REPORT OF COMMITTEE ON AWARDING BEAL MEDAL.

The President—We will now hear from the Committee on the Award of the Beal Medal.

Mr. E. G. Pratt—Your Committee of Past-Presidents, appointed at the last meeting to award the Beal Medal to the writer of the best paper at that meeting, begs leave to submit the following report:

NEW YORK, March 8, 1905.

Gentlemen: Your Committee of Past-Presidents, appointed at the last meeting to award the Beal Medal to the writer of one of the papers read at that meeting, begs to report that, after due consideration, they have decided to award the Beal Medal to Mr. Brewster H. Spangenberg for his paper entitled "Consumers' Meters."

Respectfully submitted,

ALEX. C. HUMPHREYS,
EDWARD G. PRATT,
ALTEN S. MILLER,
} Committee.

Mr. E. G. Pratt—In the performance of my many duties at this time, I have not had the opportunity of preparing myself as I would like to have done, to present this medal to Mr. Spangenberg. Many of you have read the paper as presented by Mr. Spangenberg at the last meeting—many of you heard it read by the author and have no doubt read it since—and I believe I voice the sentiment of every gentleman who has read the Spangenberg paper that the committee has performed its duty faithfully and well, and I have great pleasure in presenting this medal to Mr. Spangenberg.

Mr. B. H. Spangenberg—This is quite a surprise to me. I appreciate this medal very highly. Of course, you all know what the possession of it represents. I am very much honored and gratified to think my work has secured for me this emblem. I wish to thank the committee and the donor. [Applause.]

REPORT FROM THE COMMITTEE ON THE PROPOSED ASSOCIATION AMALGAMATION IDEA.

The President—We will now hear the report from the Committee of the Council upon the scheme of the federation of the various Gas Associations, and we will discuss the matter at this time.

At the suggestion of Mr. F. H. Shelton, Chairman of the Committee, the Secretary of the Committee read the report as follows:

MILWAUKEE, WIS., October 17, 1905.

To the Council of the American Gas Light Association: Gentlemen—At the Congress of the American Gas Associations, held in St. Louis in 1904, a Committee was appointed to draw up a plan providing for a single gas association, to be composed of the men engaged in the gas industry in North America, and submit this plan to the existing Gas Associations for ratification. This Committee was constituted as follows:

American.—Wm. McDonald and F. H. Shelton.
Guild of Gas Managers, New England.—W. A. Wood and C. F. Prichard.
Kansas.—Samuel Scovil and J. A. Bendure.
Michigan.—H. W. Douglas and B. C. Cobb.
New England.—C. E. Lamson and N. W. Gifford.
Ohio.—John D. McIlhenny and B. W. Perkins.
Pacific Coast.—E. C. Jones and John A. Britton.
Society of Gas Lighting.—C. J. R. Humphreys and G. G. Ramsdell.
Western.—Donald McDonald and Paul Doty.
Wisconsin.—H. H. Hyde and E. G. Cowdery.
At Large.—W. R. Addicks, Walton Clark, Henry L. Doherty.

After deliberating carefully, this Committee begs to report the plans embodied in the following recommendations:

That there shall be a union of the American, Ohio and Western Gas Associations into a single National Association.

That the combined Association formed by this union be called the American Gas Institute.

That the first governing body of the Institute be composed of the then Presidents, Vice-Presidents and Secretaries of the three Associations, and that this governing body nominate, either of itself or through a nominating committee, officers for the Institute to be voted on at the first meeting, and that the Chairman, who shall preside over the first meeting of the Institute, until the permanent organization has been effected, shall be chosen by lot from the then presidents of the three Associations.

That the membership of the Institute be composed of four classes—Honorary, Active, Junior and Associate—the qualifications to be met by the members in each class to be specified in the proposed constitution.

That each of the Associations which are to dissolve as separate bodies and unite to form the Institute prepare lists of their members in good standing at the time the Institute is formed, classifying these members according to the qualifications set forth in the proposed constitution, the lists so prepared to be accepted by the Directors of the Institute, qualifying each person whose name appears on them as a member, in the class under which his name is listed, without having to be elected or pay any initiation fee or dues for the then current year; provided that in order to have his name placed on the roll of members of the Institute each of the persons whose name appears on the above mentioned lists must make application to this effect in writing to the Directors of the Institute within a period of 60 days after notice has been sent him of the formation of the Institute.

That the Institute offer inducements to the District or State Gas Associations then existing or thereafter to be formed to co-operate with it, conditioned on each Association confining its elections to membership thereafter to persons directly identified with gas interests in the district whose name it bears, and on their agreeing on their part to consult with the Institute before undertaking any original work, and to do each year a certain amount of original work in co-operation with the Institute, and that the Institute agrees that each such Association shall have the right to elect one Director of the Institute, the total number of Directors to be so regulated that the Institute itself shall at all times elect at least two-thirds of this total; and that the immediate conduct of the affairs of the Institute shall be in the hands of an executive committee elected by the Directors, which shall include in its membership of 10, one man from each of the co-operating Associations as long as the number of such Associations does not exceed 6, and that when this number is exceeded there shall be on the executive committee at least 6 men who are members of co-operating Associations and have among them membership in at least 6 such Associations.

A proposed constitution has been drawn up in accordance with these recommendations and is submitted as part of this report.

In order that the plan of amalgamation set forth in this report may be put into effect, the committee recommends that the governing bodies of the American, the Ohio and the Western Associations, with the approval of their respective Associations, appoint each an organization committee with full powers to take part in the organization in accordance with the recommendations mentioned above, of an Association to be known as "The American Gas Institute," and to this end to wind up the affairs of and to dissolve the organizations they represent. And it also recommends that each governing body instruct its organization committee that it is to proceed to effect the organization of the proposed American Gas Institute, and the winding up and dissolution of the existing organization, if such action be taken by two or all of the Associations above mentioned. Respectfully submitted,

ALFRED E. FORSTALL, Sec. F. H. SHELTON, Chairman.

Discussion.

The President asked the pleasure of the Association respecting the report.

Mr. W. R. Beal moved that the Council of the Association be authorized and instructed to take such measures as might be necessary to organize a Gas Institute on the lines as generally laid down in the report.

Seconded by Mr. C. J. R. Humphreys.

Mr. F. H. Shelton asked that, before the motion was put, and in order that it might be more intelligently voted on, to say: As Chairman of the Committee, and being very familiar with the facts of the whole procedure, and especially identified with those who hope that some consolidation of the gas work in this country will be shaped out, it may be proper that I make some remarks on this matter. I would like to do so, as I think it would make the matter clearer to those not fully conversant with the present status. This matter has been underway for something like a year and a half. It took shape in St. Louis in concrete form in the appointment of a committee, the names of the members of which were just read. It had its inception in the growing conviction that there were a number of evils or disadvantages in our present method of working, which were growing worse and ought to be bettered. Without attempting to enumerate every evil, it may be well to remind ourselves of some of the weaknesses of our past and present methods of working. For instance, there are too many associations doing the same work, working in parallel, expending energy which is being re-expended by some other association on the other side of the country. The New England Association may be working out data on the matter of standards, and the Pacific Coast Association may be doing the same thing. These standards may differ, and it means that the work has to be threshed over by a third body, or even more, and a final standard determined for the benefit of all. Our present methods mean that there are several sets of secretaries necessarily maintained by the different organizations, with the accompanying expense. The money that is paid in dues to all of the major associations is quite a sum, but it is spread out rather thinly in the publishing of various sets of proceedings, in the various expenses of meetings, etc., of the separate organizations and secretary's salaries, and it is obvious that the full benefit of a given total sum of money is not gotten under the present methods. There is, moreover, a strong tendency towards rivalry in the different Associations which is, in the shape it has taken, not a beneficent feature in gas association work. We may say what we please, but the rivalry for additional membership, in order to get additional income, and make a better showing against some other association with which it should not be a competitor, has tended to some acrimonies, if I may so express it, and has in the last couple of years led to a not entirely satisfactory condition of affairs. Another weakness in our present position is the lack of organization for mutual protection or benefit on large questions which from time to time come up. Take the matters of taxation, municipal control, or legislation, in particular. If these questions develop and become menacing, there are at the present time half a dozen gas organizations, not united, not working in common, not having agreed on a common platform of resistance, not having formulated a proper statement of facts with which to repress legislation of an unfair character or any other unfair action. Then in less important things, or the ordinary things, the gas men have not been so united in their work that they can best handle matters which from time to time turn up. If friends of standing from the other side come over here and accept the courtesy of the gas business at large, from whom shall they first take it? Who shall entertain them? Who has the prestige of the American gas business? That particular point is much less important obviously, but it is a detail which could be bettered. The questton of industrial exhibits about once in so often turns up, and the exhibit at the St. Louis Exhibition was immeasurably short of what it might have been had it been a representative exhibit backed by the entire gas industry of the country, instead of being an Association exhibit and the showing of only one Association. I think I scarcely need continue in pointing out that there are many directions in which, while our work has been good and has been advantageous, it could be very much improved if we could get on a better basis. I think most of

you will concede that that position has in a large measure existed. Now, the committee when it met composed of men throughout the country representing the different organizations, had submitted to it a variety of plans for getting on a better basis. Some were simple and some were complex, and after various discussions and conferences the committee felt that any movement to put the Associations together into a single, united working body would have to have as fundamental features these points: First, no absorption of one Association by another. The reasons are almost obvious. The different Associations for years have been building up their organizations, their prestige, their work, their traditions, their sentiments, and they are entitled to recognition of such certainly on an even keel, and not to be dominated by some other Association which by some other plan would not equitably recognize each constituent member in the general body. It recognized further that it would be better for the National Association so-called, and by that it means Associations whose work was aimed to be of national character and not limited to the State but throughout the country, and as our membership was taken from all parts of the country, it was felt it would be better for such an Association to get together and not disturb State or district Associations, because the more discussion there was had, the more it was brought out and emphasized that there was a great amount of local work and good work which can be done by a State Association, and best done by a State Association, and often only done by a State Association, and that anything which would obliterate State and District Associations would be very harmful and make no end of trouble in formulating a plan, if such an effect were involved. The committee also felt there would have to be some recognition of the present officers of the different Associations. Such men have, by good work and constant attention to the interests of the Associations, reached the positions of prominence which the occupancy of an office in the Gas Association implies, and it was felt there should be some recognition of that fact in forming the first management of the new Association, and it was finally felt that any plan, to be effective, would have to have two elements, one of simplicity and the other that of not involving any great radical departure, because in accustoming ourselves to radical departures or strange ideas, or something entirely new, is better secured gradually than if we undertook to bring about such things at once. It was felt in brief that the scope of the new organization ought to be similar to that of the United States Congress and the several States; that the national body would represent the Congress, served and fed and assisted by the State Associations, but that the National Association should be limited to one main body for the future. It was finally worked down to the feeling that the three Associations which are practically the National Associations as to membership and work—the American, the Ohio and the Western—would be the logical and the proper ones to unite, if a feasible plan could be shaped out as to details, and without requiring any particular concessions on the part of these Associations, except possibly the giving up of their name. So that that point took shape in the suggestion and final determination to recommend the name of the American Gas Institute, in the sense of being different from any name heretofore used and yet proper in its adjective "American," being thoroughly descriptive of all interests which might be advanced by it and the subject "Institute" conveying an idea of the dignity and purpose and size and prestige that such an organization would naturally imply. I think the success of the plan that has been worked out has been most remarkable. If you followed the reading of it by the Secretary, you must have noticed that it is not particularly different from the plans on which we are now working. It is a democratic plan. The ballot prevails over everything, and there are plenty of provisions for the protection of any element that might fear it may be boycotted or not properly treated. For instance, 20 members can set up another slate of candidates, if there is a feeling that the regular Board and the regular procedure had put in a certain clique or set of men representing one of the older associations; 20 members at large can set up another slate, with the full powers of a Nominating Committee, and prevent any combination of that sort which may develop. One-tenth of the probable membership, or even less, can call a special meeting over their own signatures, if they feel there is any emergency or condition which renders that desirable, and the Board of Directors are bound to call a meeting upon the request of a comparatively small number of the new membership; in other words, the aim of the committee was to put in such attractive features in its plan so as to escape any criticism of the plans for arranging any of the affairs of the Association, such as the place of meeting, the personnel of the new Board, or on any questions which might prove stumbling blocks. An evidence of that was the perfect willingness of each Association, if it elects to go forward on this recommendation of the Council of the American Association, to take its chance by lot as to the first president of the new governing body. The new governing body is proposed to be composed of the present presidents, vice-presidents and secretaries of all of the three merged associations, and they simply draw lots to see who shall from among the number be the first president of the new organization. There is no more practical or fairer way by which the committee could manifest its intention that all Associations should be on an even keel. It seems to me the question of membership in the new Association is admirably handled, simply that the members in good standing should by the fact of the merger become charter members of the new Association. The more you analyze the plan submitted by the committee, the more you will realize that there is little radical change proposed in the present methods of conducting the work. The greatest change is really aimed to go forward, in the recommendation of the committee, if it carries, in getting all three Associations together, and then be in shape to make such aims and have such additional features of work and such development in our Association work as may be proposed and as may appeal to our united membership as desirable. The committee does not put in any radical features. Its report makes me think of the story of a man in a hospital who related to a friend the extreme humiliation that the surgeon gave him. He said he had a cut 7 inches long on one side, 13 stitches on another side, and 2 or 3 bandages and breaks on still another side. His friend replied "You are lucky they did not plaster you." I think the Aseociations can in a sense feel that they are fortunate that the committee did not plaster, that they did not go into radical work. The committee aimed to report something feasible which will follow closely our present methods of work and which, after we all get together, would leave us in the position of doing all the plastering we want, if we want to go up in the air on new ideas or new things. Personally I believe very strongly that there are several new departures that our Associations either individually or collectively if we merge should consider, and it is merely a merger. I think there are several directions in which we should do better work, and I sincerely hope that if this movement carries, if the three Associations named get together, that one of the first steps of the new governing body will meet and take up the consideration of 3 or 4 points specifically pointed out in the Councils of the committee as extremely desirable for us to incorporate in our Association work. It has been pointed out that the largest company in the country pays $10 a year for membership, and puts out thousands of millions of feet of gas per year, but contributes an infinitesimal sum in proportion to the benefit it gets from the work of the Associations, and there has been a suggestion that some plan be evolved by which some income shall be secured to the Association for the benefit of Association work, to be gotten from the companies more or less *pro rata* to their outputs. This has not been a feature of our work in the past, but I am one of those who believe it should be in the future. It would be almost no tax on the companies, but it would greatly increase the amount of cash we will have in the treasury of the new Association and should not be difficult to secure. Another suggestion has been that there should be some provision for certain particular sections of our work; the accountants, for instance, doing their work more separately than as a part of the general work. Those who are interested in the chemical side of the organization might form a chemical section, and might have some special recognition. There is a growing work in connection with the producer gas engine work, which is highly specialized and which has in the minds of many not been sufficiently recognized in present American gas practice and methods, and which would have an easier and better chance to come forward under other conditions. I hope that if this matter goes through, one of the features which will be taken up at once will be some plan by which the gas producer workers, the engine workers, accountants, and others whose work is particularly specialized, and whose work is not cared for by the rest of us, will have a chance to develop and work all together in team work that they do not now have, so that the whole thing makes me think of the method of looking up the Washington monument. I was told when you stand at the base of the monument and look up you can see part way, and have to take a second look to see the other half. It seems to me that if we get together on this merger that that is going halfway towards reaching the pinnacle of all that is so much desired in the matter, and that we are then in position to go the other half, and that by taking up item by item, step-by-step progressively, carefully but earnestly, we can work out various propositions at large for the betterment of Association work. It seems to me there is no question about the distinct merits of this matter. It has been studied over by the best class of men in the business for the last 18 months earnestly and conscientiously. It has been winnowed and threshed out and boiled down to the present position. To

my mind this is a golden opportunity for the American Association to show its broadness of view and disposition to get together on such a platform as has been suggested. Bear in mind that it does not commit this Association unless the other Associations join in the movement. As I understand it, this recommendation of the committee has been received favorably by the Council of the American Gas Light Association, and the Council of the Association has recommended its adoption, but if this body votes to adopt it it commits itself to nothing unless at least one of the other Associations joins in. It is hoped and believed that the others will get together; that they cannot afford not to do so, as the plan of amalgamation offers so many advantages. In closing, the whole thing reminds me of the old couplet:

"Vice being a creature of most hideous mien,
To be hated needs but to be seen.
But seen too oft, familiar with her face,
First we pity, then endure, and then embrace."

I have made a little paraphrase of this which I think applies to this Association.

"Amalgamation at first was a creature of most hideous mien,
To be hated need but to be seen.
And seen more often and familiar to the face,
Should not be pitied, nor endured, but embraced."

Mr. H. L. Doherty, in asking for the privilege of taking up a few minutes' time, said: The primary object of this committee was to secure better Association work. I presented a plan to the committee at its original meeting, which I believed to be a proper one. It provided ample funds, it provided for national sections, geographical sections and company sections. I wanted to carry the benefits of Association work to every department, to every section, and to the humblest employee of gas companies. In the wisdom of the committee my plan was too elaborate, and I have been in the unfortunate position of being the single negative vote in the closing meetings. Mr. Beal made the statement that there was no opposition, that it was unanimous; that was not the case. As perhaps some of you know, I have been a student of Association methods and work and have studied the form of organization and procedure of every Association which exists in this country of any magnitude, and I have also been in very close and intimate touch with the recent work of many of these Associations. We are facing some serious problems which call for a single, strong Association, and not a divided house, and I believe we have reached the point where opposition to this plan is apt to be harmful for the industry. The plan as outlined is simple, it is ingenious and it is practically free from objectionable features, and my only objection to it, when I voted in the negative, both as a member of the special committee and as a member of the Council, was that it did not comprise as much improvement in Association work as I would like to have seen. It, however, does promise this—it promises amalgamation and the possibility of securing better Association work. I know my associates on the committee are anxious to bring about these improved conditions, but did not want to vote for a plan which they believed would be so elaborate as possibly to threaten the success of the whole scheme. I think the objections which were made to my scheme could all be overcome. My ideas were intended to make this organization the strongest, the best organization of any of the existing organizations in the country, no matter to what industry they related. I have been interested in Association work. I have spent my time and money to improve them. I have had no axe to grind, but merely wanted to see Association work in the gas business organized so that it promised the greatest progress to the art and the greatest progress to the men engaged in it. I feel that the time has come when we should bury our little differences. Things cannot be made to suit everybody, and as everybody's views will not be the same, we cannot have 100 different plans, but must have one. This report, as you have heard it read, has passed the sub-committee, and the Council of the American Gas Light Association, after careful consideration, with only one dissenting vote. I cast that dissenting vote. I withdraw the vote now and tender my hearty support to the plan. I am willing to put my shoulder to the wheel and work for the success of the plan, and I believe that every man interested in the progress of the art should do the same thing.

Mr. W. McDonald said he had no purpose in taking up time in discussing the plan before them, but being the other member of the committee of the American Gas Light Association he thought it fitting to say a few words. The principal points he wanted to make in the few words he should say were: I have been, as you all know, the warmest kind of a friend of the Western Gas Association, generally stood with its interests when in any way they clashed with other Associations, but I have come here, satisfied that this is the right thing to be done. I believe if this action is not taken to-day (and I have but very little fear that it will not be taken) the opportunity will pass by and it will be long years again before the opportunity will come to make this amalgamation as it occurs now. Therefore, I do most sincerely hope that the members of this Association will vote as nearly unanimously as may be possible in favor of this motion, because our action will carry great weight with the other Associations.

The President noted that the question was on Mr. Beal's motion that the Council be authorized to take the proper steps to inaugurate the American Gas Institute. [The motion as put was carried unanimously.]

On motion of Mr. D. McDonald (Louisville) the Committee on the Next Place of Meeting was instructed to defer its report until after the Ohio and Western Associations had an opportunity to act on the same question.

A Vote of Thanks.

On motion of Mr. W. R. Beal the thanks of the Association were tendered to the various committees that had to do with the amalgamation question for their very elaborate and comprehensive report.

Election of Officers.

The President asked for the report from the Committee on Nominations. The report of the Committee was read as follows by Mr. William R. Beal:

Milwaukee, Wis., October, 18, 1905.

To the American Gas Light Association: Gentlemen—The Committee appointed to nominate officers for the Association for the ensuing year respectfully recommend the following:

For President.—Charles F. Prichard, Lynn, Mass.
" *First Vice-President.*—Charles R. Faben, Jr., Toledo, O.
" *Second Vice-President.*—Alfred E. Forstall, Montclair, N. J.
" *Third Vice-President.*—Arthur G. Glasgow, London, England.
" *Secretary and Treasurer.*—George G. Ramsdell, New York City.
For Members of Council.—F. H. Shelton, Philadelphia, Pa.; H. L. Rice, Aurora, Ills.; T. R. Beal, Poughkeepsie, N. Y.; George McLean, Dubuque, Ia.

On motion of Mr. Walton Clark, the Secretary was instructed to cast a ballot in favor of the gentlemen nominated.

The Secretary duly reported that the instruction had been carried out, and the President announced the final result.

Resuming the Discussion on the Forstall Paper.

The discussion of the paper by Mr. A. E. Forstall on "Methods of Charging for Gas," which was interrupted at the hour for adjournment, was then resumed.

Mr. H. L. Doherty said he thought that the question of equitable charging for gas was a feature which would limit the eventual sales of gas more than any engineering feature could possibly do. Mr. Forstall referred to two papers formerly read, one by Mr. Clark and one by himself, both of which really were papers advocating a consumer charge, in that they advocated the expense of collection should be at least partially borne by a fixed charge and not divided over the amount of gas sold. A few months ago, when in his mother's home at Columbus, O., he found she used natural gas in one part and coal gas in another part of the house. Asking her to explain why she did not use natural gas only, her reply was, she could not get the natural gas on cold days and used the coal gas as a matter of convenience. Becoming interested in the matter he hunted up her bills and found she was using about 50,000 feet of gas per year, paying $10 therefor. The entire fuel bills amounted to something like $80 a year, and assuming that figure was right, also assuming that the expense of collection amounted to $4 per year, it meant that 40 per cent. of all the money she paid into the natural gas company represented collection expenses, leaving only 60 per cent. to cover gas and the other expenses. Had she used gas for all her heating and lighting and cooking, the collection expense would have been only $4 on the $80 a year, or about 5 per cent., instead of 40 per cent. If they increased the sales of gas in the case of all their present consumers without raising the maximum demand, they would only have to pay money for raw materials and the labor directly proportional to such raw materials. Taxes, interest and other expenses, if advanced, would be advanced very slightly. With the ordinary gas company, fully 70 per cent. of the disbursements would be expenses other than output. The paper referred to by Mr. Forstall, where a collection charge of $2.50 per year was arranged, would mean not over 7 per cent. of the entire receipts. The arrangement Mr. Forstall pro-

posed would provide for only a small percentage of the receipts in the form of a fixed charge, wherefore the speaker saw no reason why the fixed charge should not be based on every expense that did not increase or diminish directly output expenses. Another thing: They could not apply this system of charging to those customers who would be adversely affected by it, which meant that they could not give the profitable consumers all of the benefits they would be technically entitled to under this system of charging or at least the benefit could not be given until they further developed their market. If they charged one set of consumers per 1,000 cubic feet basis, and allowed all unprofitable consumers to remain on the other basis, some one must settle the expense that these consumers occasion. Therefore, he saw no other way of applying this method of charging than to put in an optional rate which did not seriously affect this gross revenue or net earnings, and as rapidly as they could develop business to have the method of charging continue, and to make reductions to apply by gradations to the profitable consumers. They know that the tendency in the matter of charging by a quasi-public corporation was downward, perhaps more so by gas companies than any other. If they could confine their future reductions to profitable consumers and in that way open up new fields for the development of new business, they could eventually sell at a lower rate to all. They now had many consumers who used their service as matter of convenience. He never saw why these should be carried on the system at a loss, but assuming they must be carried on at a loss it seemed to him illogical to give them further concessions. When they were selling gas for $1 per 1,000, they were charging about $1.50 per million B.T.U., and there were few towns where fuel could not be bought in the form of coal at from 15 to 20 cents per million B.T.U. The only hope of successful competition of gas with coal was to have the appliances of such efficiency that the great difference was made up. They could afford to carry an investment big enough to take care of the peak of some particular consumer who might demand gas at the high rate for 1 hour out of 8,760 hours in the year. If they attempted to do that, it meant they would never be able to sell gas at a cost approaching the value of solid fuel. If they must provide transportation system for their product, and then could only realize the use of that transportation system to the extent of 5, 10, 15 or 20 per cent., it meant that the divisor of cost for maintaining that transportation system was small, and, therefore, the cost per unit so large where this fixed expense, of which they had been talking depended entirely for the size of their divisor. Mr. Forstall not only wanted to take average results but the average results at the point of outlet of the peak of the holder. This he thought was manifestly unfair. Ordinarily they supplied the consumer with a 5-light meter, which if used continuously would pass a million feet of gas per year. The consumption of the individual consumer varied all the way from nothing, to say, 500,000 cubic feet per year, averaging about 30,000 feet per year. The small user who consumes 30,000 feet per year must have a meter capable of passing 1,000,000 feet per year, thus the load factor on the plant was correspondingly increased. Mr. Forstall indicated by his statement that the average sales of gas were one-fifth of the maximum; in other words, that the average gas plant on these main transmission lines had a load factor of about 20 per cent., which meant that 20 per cent. of the gas was sold that the main transmission system was capable of carrying. When it came to a given section of distributing main, they got a much lower load factor than that indicated by Mr. Forstall, and it was only when they got on the main transmission line, where all consumers were averaged, that they got the load factor treated of in the paper. Some of the speakers had referred to this method of charging as an experiment, but it was not an experiment. It had been used in the electric distribution of some of the companies with which the speaker was connected for over 3 or 4 years. Personally he was not urging the adoption of the system. It was a matter of indifference to him whether any one adopted it or not. Where it had been applied in the electrical department of his companies it had removed nearly all complaints. Where it had been applied optionally, and not forced on the consumers who would be affected unfavorably by it, it caused the greatest possible increase of consumption for a given investment. In Denver it had built up the consumption of current per lamp connected from 16 kw. per year to 43 kw. per year, or, at least, while this system of charging had been in vogue the consumption per lamp connected had been increased according to the figures stated. Last year they started to apply the rate on a certain portion of the gas consumers, believing they could so develop the business and increase the net earnings from the consumers, that they could make further cuts until they reached practically all other consumers. The first consumers were put on this method in March last, and they had increased their consumption over 40 per cent. The Company was now in a position where they could make another cut and develop their business still further. For the most successful application of the system, he believed that the fixed charges should be very high. The lower the cost for gas, the more freely would that gas be used, and the more effort would the consumer make to use it, as long as he did not increase his maximum demand.

Mr. J. W. Dunbar asked Mr. Doherty if in the application of his rates he met with any resistance in the way of legislative enactments, and if he had how he overcame them? In Indiana gas companies were prohibited from charging a consumer for more or less than the register of the meter showed.

Mr. Doherty replied that he was not a lawyer, but it seemed to him that any such law carried to an ultimate result would virtually result in a confiscation of property. If he were in Mr. Dunbar's place he would not hesitate at all to limit the consumers' demand so that they would have to use the gas ½ of the number of hours in the year, then if they wanted the service on that basis they could have it, otherwise he would insist on them paying the company a proper return on the expense occasioned.

Mr. Donald McDonald (Louisville) said that for the benefit of those who contemplated putting in force any such thing as a meter rent or under what other name they called it, the courts held it was legal and proper to charge a higher rate per unit for a small consumption than for a large consumption. In other words, they could charge a man for 100 feet of gas a higher rate than they would charge the man who used 1,000 cubic feet of gas. The courts had upheld that sort of discrimination.

Mr. Dunbar asked Mr. McDonald to explain a little further, as almost all gas companies have a limit as to the amount which they might charge. His company charged as the limit $1 per 1,000; but what he would like to know was whether the courts would uphold them in charging $1 for 100 cubic feet.

Mr. McDonald replied not if one were under contract with the public to furnish it for 10 cents. In the absence of franchise restrictions the courts would uphold the general principle of refusing to furnish any customer at a loss to one's self.

The President said that the discussion was of great interest, but as they had so much work ahead of them, he thought he would have to ask Mr. Forstall to now close the debate.

Mr. A. E. Forstall said that if he slighted the earlier discussion that occurred it was because he had made very fragmentary notes, depending on memory, as he expected to answer the arguments while his notes were hot; but he would try to take up a number of the points stated. As he understood it, the chief difference between Mr. Frueauff and himself was the speaker included no profit in the fixed charges, while Mr. Frueauff did. His point of view was that a gas company is in business to sell gas at a profit. Incidental to selling gas it found it necessary to supply a certain amount of equipment in order that the consumer might be able to use the gas. If they get back only interest and depreciation with the cost of maintaining this equipment that was all they could expect to do. They sold gas stoves and placed house piping, etc., simply because they had to do so to develop their main business, wherefore to his mind the profit should be made not on the incidentals but on the gas sold. It was necessary to keep from making no profit on some of the consumers, that they charged them the cost of furnishing the installation and maintaining it, but for nothing further. Another objection of Mr. Frueauff was that the speaker did not take care in the maximum demand charge of the fixed charges for consumers, etc., at the works. He thought it was very hard to connect these consumers with the maximum demand, and it seemed they would vary more with the ideas of the managers of the company than they would with the difference between maximum or even average demand. They had no right to charge up such matters against a maximum demand charge. Mr. Dawes seemed to make the mistake made by practically everybody who has stood for a uniform price of gas per 1,000 in that he confused the small consumer with the poor man. The small consumer who caused them the most loss under the uniform method price of charging was not the poor man, for the latter used gas quite liberally and in most cases would only be slightly affected by the proposed change. The smallest consumers and most unprofitable consumers they have were the offices and houses of comparatively rich men, who maintained a gas meter simply for the sake of turning on the gas in case the electric light went out. The idea that if they put such a method of charging into effect would result in antagonizing the poor people seemed to him an entirely mistaken one. As far as making a differential charge was concerned, which Mr. Dawes seemed to be afraid of, he did not know of a single company

that did not make differential charges. Perhaps there were some who did not, but he did not happen to recall them at the moment. In order to avoid unduly increasing the charge at all to the poor consumer, it would be necessary to make the change at a time when the reduction in rates was being made, in which way it could be made so that the poor consumer would pay practically no more than he had been paying before. Mr. Doty seemed to think the speaker was trying to take care of the business on an investment of 37.5 cents on a certain amount of annual sales, but he overlooked the fact that the amount of investment taken care of in the maximum demand or consumer's charge was not the total, but merely the investment required by the maximum demand over what would be required if the demand were an average one, and also that it was only the excess of the investment required over what would be put in in any case, no matter how small the demand was. Mr. Van Ness made the point that if they put into effect any such method of charging, they would discourage the new business promoter. The speaker thought the new business promoters of gas companies should be discouraged about going after certain lines of business, and if they were discouraged on those lines their time could be more profitably occupied than at present in getting consumers along profitable lines, so that that argument did not appeal to him at all. He hoped it would discourage the new business promoter on certain lines along which he often worked. He differed with Mr. Doherty as to his opinion of not being able to apply this rate to all consumers. He thought in course of time they could apply this rate to all consumers, and his object was to show how it could be so applied in the course of time. If they did not see what they were working for, they might never get there. If they allowed the present expediency to cover up the ultimate end the end was apt to stay buried. He agreed with Mr. Doherty that the future reductions should be made to profitable consumers, and that in cases where companies changed gradually from the present method of charging to the method advocated in the paper, it should be made so that if possible the charge to small consumers should stay about as it was and that all the reduction should go to the large consumers. As far as the charge for the actual maximum demand of each consumer was concerned, he maintained the position that the only charge they could make was for the actual investment and he did not see how one could prove they had made any such investment when the average came out much smaller than the figure provided for as the average maximum demand as it worked out, but in providing this maximum the question of equitable investment was also covered by the point made in the paper that they would have to supply a man with some service and some meter, and that they could not supply him with a meter smaller than the 5-light meter at less cost, the only extra investment in supplying the meter being the extra cost over the 3-light meter. In practical operation no one would put in less than a ¾-inch service pipe, no matter whether the consumer used 1 or 100 feet of gas per hour, so that the excess investment in that case was only the extra cost over the ¾-inch pipe. Mr. Dunbar's point was taken care of in the case of the New Orleans Gas Light Company against the Harmony Club. The latter was using electric light exclusively, and in New Orleans as the electric service was erratic, the light was apt to remain out often for an hour. The Club demanded a meter from the Gas Company large enough to supply gas to light the whole club house, and they used the meter possibly 2 or 3 times a year. The Company tired of that and insisted that the Club should either pay for a certain amount of gas per month for the use of the meter or accept one which would pass on an average over the year the amount of gas that the Club used. The Club obtained an injunction against the Company, preventing it from taking out the meter. The case was carried to the Supreme Court of the United States, where it was finally decided that the Club had no inherent right to use the Gas Company's property for their own convenience, and if the Club wanted a large meter they would have to pay for it. As far as the franchise enactments were concerned, many companies are in the position where they cannot do anything but charge the consumer a flat rate. What they must do was to get such franchises changed. As far as not being allowed more than a certain amount of excess, he made the point that the method did not charge any more than a certain amount of excess. He thought it could be shown they were not charging for excess, but simply for service equipment they have to give a consumer, whether he takes gas or not, which he should be willing to pay for and which they should be in a position to make him pay for. He thought that point was clearly brought out, by way of sustaining the position of the Company in making such a charge. Mr. Lathrop seemed to think that 4 per cent. was not enough for depreciation of gas property. If 4 per cent. of the value of their plant was invested every year at 5 per cent. interest, and you figured this on the cost of the plant, you could replace the whole plant in 16 years. He did not know of any works which had been replaced in 16 years, and besides there was a great deal about a gas plant which did not have any depreciation, because it was taken care of by maintenance. Retort settings were renewed every 3 years, and the charge all went to maintenance and repairs. There was no depreciation on meters, as that was charged to repairs. He would like to get some one one who would renew a gas works every 16 years. The 25-cent charge at Mauch Chunk, Pa., was probably too small. It was the first step in the direction of putting in the compulsory charge, and he wanted to get the thing started. He thought when they got into a position to decrease the price of gas they would increase the fixed charge, so that the smaller consumers would pay about the same and the larger consumers would get a better reduction. If he had not covered all the points, he asked the forgiveness of those whose points he had overlooked.

(To be Continued.)

Address of the President (Mr. W. W. Cole, Elmira, N. Y.) of the Empire State Gas and Electric Association, Delivered on the Occasion of Its First Annual Meeting, New York City, October 31, 1905.

In dealing in so broad a subject as the aims and objects of this Association I can, of course, only give suggestions, which are materialized from the influence of the public press, from personal knowledge of actual conditions and from ideas and information conveyed by persons who have studied co-operation of interests upon a system. The chief aim of this Association should be to affiliate all gas and electric interests in this State with the object of mutual benefit from advancing and improving the general commercial interests. In associations the individual members of companies are brought together for the interchange of ideas and confidences which in turn permits of a general conduct of affairs through the State upon lines consistent with every advancement which can be made to influence not only the manufacturing and distribution departments, but the general commercialism.

General Commercialism.—Under general commercialism should be considered:

(1) Relations between the companies and the public; (2) adoption of standards in construction and maintenance; (3) compilation of records of accidents and actions brought by or against the companies; (4) promotion of intercourse between companies for the study of new methods and wrinkles; (5) avoidance of waste by unwise competition between gas and electric companies.

I shall not attempt here to define how the above divisions can be best handled by Association system and influence, as I believe that they should have the careful consideration of every member of the Association and the methods defined by a board or committee that has had the advantage of the composite ideas and intelligence of the entire Association, and there should also be some relation established with our various technical and engineering associations.

Combined Effort —I now lead up to conditions which I believe can only be properly coped with through combined effort. These conditions I think should be classified as:

United action on conditions threatening the economic status of lighting industry; united effort in obtaining a proper interpretation of the laws; united action in the dissemination of comprehensive information.

That is, articles well thought out and well wrought out and less of gossip, for it is a self-evident fact that knowledge of the truth is not sought by the public but must be forced upon their attention. Some one discovered that corporations have no souls. It is probable if a corporation had a soul we would all believe in the transmigration of souls and would be assured that the soul had been projected into the body of the under dog, which, when it ran was nipped behind and when it stopped or staid was given dog buttons.

Our companies are public servants which can neither vote nor participate in making the laws by which they are bound. If any corporation was to undertake to express its views from a public platform, or to influence the votes of those who obtained their living from its operation, they would figuratively be buried in the earthquake that would shake the foundation of the entire social order of things, and should the corporations assume the rights of an individual or take any position except one of submissive silence they at once become the object of suspicion and prejudice.

Economic Status.—In bringing before you conditions which affect the economic status of lighting industries I will quote from the Oregon *Daily Journal* of August 19th.

"In a country with universal suffrage it is desirable to limit the number of public officials to the smallest possible number for political reasons; and there are also economic reasons which apply especially to lighting, traction and other public service corporations which are large buyers of materials, employ large numbers of persons and require a high order of administrative ability; indeed, water, a natural product, which runs down hill and is distributed with a minimum of labor and expense, is about the only public necessity justifying public ownership in this country and even in this there are exceptions. Nothing can be truer as a rule than that public ownership waste exceeds corporate profit; supplement this with the even more important political consideration and thoughtful citizens may well hesitate to favor the present socialistic fad of municipal ownership. Of course, its advocates play upon public prejudice and claim economies for public ownership which do not exist. Public officials where municipal plants have been established are naturally interested in making a good showing and holding their easy jobs; in many instances their bookkeeping omits interest, taxes, depreciation, sinking fund for renewals or improvements and other items which a private corporation must recognize. The taxpayer is a convenient beast of burden upon which to unload deficits and he in turn unloads it on rentpayers where he can. Under public ownership, new inventions, improvements and extensions are ignored. Under private ownership the best professional talent is employed at salaries unheard of in public employment and all these improvements are at once utilized, giving the public an up-to-date service. Individual initiative and energy, coupled with the co-operation of many small partners in corporations, have made this country great and I cannot believe that the socialistic propaganda will prevail if the facts are properly presented to the jury of American public opinion."

I would also call your attention to an extract from the paper read by Mr. Arthur Williams at the National Electric Light Association convention held this year at Denver:

"Street illumination, whether from the central station or a municipal plant, should be a question of relative price and cost. When threatened with municipal competition it should be made clear that prices are no more than the cost of corresponding service if derived from a municipal plant, adding an admittedly fair profit. Where incorrect figures and misleading opinions are publicly circulated, they should be corrected with equal publicity. In a matter of this kind, nothing equals counteracting publicity. This is an age of reason, of eventual control through public opinion, and the lighting companies have the same weapons at their disposal for defense that their opponents have for offense. The present prominence of municipal socialism as a political question is the result of publicity largely on one side, and there should be united effort on our part to meet it and restore normal conditions. This can be accomplished with united, concerted effort; all of which is well worth while, for the question may be extended into the different political parties, and possibly into national as well as State and municipal politics."

This Association can create a board that will work up and keep in operation a character of service in protecting the economic status of our industries that will be of benefit to every company in the State. This Association has no history back of it and must start out in the State as a pioneer and gain an experience from hard knocks that come to the pioneer who should protect his home and boundary lines. In years back when the companies were small and of a more isolated nature, the officers of the company generally owned the capital stock and dictated the policy; if mistakes were made they took out their own pocketbooks and paid, but with the great development in power and lighting combinations and the enlarged character of service now rendered the public the policies are dictated by men who are technically and scientifically educated and separate from those who look after the financial condition. To-day the public owns the lighting corporation, the stock and bonds are held for investment by all classes of men and financial institutions. In nearly all cases the companies are striving to meet the public requirements and the situation is not benefited by drastic laws and ordinances, ostensibly for the welfare of the public, but which are, in their ultimate effects, antagonistic to both the lighting interests and the public, for as the public and company interests are really identical it would seem that, with our true position demonstrated by the Association, our rights can be protected.

Interpreting Laws.—In taking up the necessity of a *true interpretation of the law*, in the theory of the law, a corporation is an individual, but apparently only for the purpose of enabling it to be got at. It has all the obligations of individuals, but few of their rights. A corporation, even though it is organized to serve the public necessity, may neither vote nor in any other way participate in making the laws by which it must be bound. As an illustration of the proper interpretation of the law I quote from *Public Policy*, issue of October 14th:

"A decision of widespread interest was recently handed down by Judge Baker of the United States Circuit Court at Indianapolis. The sum and substance of this decision is that, in Indiana at least, a private corporation cannot enter into an agreement to sell out to a municipal government. It appears that the Consumers Gas Trust Company, of Indianapolis, entered into a contract with the city of Indianapolis to sell to that city its entire plant at any time after the expiration of 10 years. The value of the plant, it was provided, should be determined by arbitration. Time passed and the Company has undertaken to wind up its affairs and dispose of its plant. But its contract with the city, permitting the city to take the plant, appeared as a cloud upon the Company's title to the plant. Thereupon a suit was brought to invalidate at least that portion of the contract whereby the Company agreed to sell out. This agreement was attacked upon a number of grounds. Most of these the court passed over, coming at once to the fundamental question governing the whole matter. This the court conceived to be the question: 'Had the Company the right to make a contract to sell to the city?'"

To this question the court replies:

"A quasi public corporation is bound by definite obligations to the State. The granting of a charter by the State to such a corporation is not simply a license to the corporation to engage merely as long as it chooses in serving the public, but the Company's acceptance of the charter whether granted by a special or general act is a promise and undertaking on its part that it will do nothing and suffer nothing to be done that will disable it from performing its duties during the term of its charter. There is no pretense that the gas company was authorized by its charter to enter into an option to sell all of its property in gross. The policy of the State, according to the decisions of the State Supreme Court, is to hold such a corporation to its obligations to the State embodied in the charter. An engagement of such a corporation to strip itself of all its facilities for serving the public is as much against positive law as if that act were expressly prohibited by statute, for the declared rules of public policy are as much a part of the body of the law as any statutory enactment.

"In short, the Company, by taking out incorporation papers, entered into an implied agreement with the State to perform the service for which it incorporated. It followed, therefore, that it could not, as one of its first and most important acts, make a valid agreement with another party to cease under certain conditions to perform its obligation to the State. It did not matter, the court indicated, that the city had municipal powers. That fact would not absolve the corporation from its obligation to the State—the public. It being found that the Gas Company was wanting in corporation power to enter into the contract, the fact that the city was a party thereto cannot alter the situation or result."

The Court adds:

"To what extent municipal ownership shall be carried is a political question to be answered by the political department of the State. Municipalities have only such powers as the State confers upon them. Their charters are given and are taken away by the legislature. If cities have not the powers they desire in the line of the ownership of public utilities they cannot create them by ordinance or contract; they must go to the legislature."

All of this is exceedingly interesting because in every direction municipalities are endeavoring to incorporate in franchise grants "take-over" provisions. It is true that Judge Baker's decision was largely an interpretation of the State laws of Indiana, but while the State laws may differ they are all founded upon similar generally accepted principles. Therefore, it is not unlikely that Judge Baker's reasoning will be found to apply to other attempted "take-over" contracts between corporations and municipalities in other States. It would seem to be a proper function for this Association to address itself to educating the public to a definite legislative policy which will be fair to the municipalities, securing to the public the best service at the lowest possible price, and protecting corporations by giving them franchises which, while conceiving municipal control, will insure to the investor the permanency of the undertaking.

The late Charles O'Connor said: "By means of general laws, admitting no favoritism or partiality, all requisite facilities through corporate forms should be afforded individuals for conducting every description of lawful business, so as prevent any needless action by the

municipalities or the employment of its officers in any affairs that could be committed to individuals as a business."

As a further illustration of interpretation of the laws I will quote from the Central Electric Light and Power Station Report, issued in 1902 by the U. S. Department of Commerce and Labor:

"There is a leading opinion by a Massachusetts court in which the majority of the justices affirm that the sale of coal and wood is not a public purpose, and that cities and towns could not be authorized by the Legislature to open municipal fuel yards."

At the same time Massachusetts is the State in which municipal ownership of lighting plants has been most liberally extended, on the broad grounds that whatever is of general utility or convenience to any community constitutes a public purpose. The court applies this principle to the manufacture and sale of light and gas, on the basis of general convenience of service, the impracticability of each individual rendering the service for himself and the necessity for using the streets in a special way or of exercising the right of eminent domain. The failure to assert rights when they are threatened is always taken as a confession that they do not exist and enroachment follows enroachment with ruthless certainty. It would seem that here indeed there is a work which this Association can perform, and by the combined efforts of the individuals we can at least obtain an impartial verdict founded upon fact, and by gradual education remove from the minds of investigating committees a frankly admitted antagonism.

Publicity.—I now come to united action in the dissemination of comprehensive information. There is undoubtedly a growing tendency among all public service companies to define the actual conditions of operation and explain the position of the company in the columns of the newspapers, and it is I believe the general belief that the conduct of public utilities must sooner or later be brought under the limelight of publicity. We are treated almost daily to articles misrepresenting the industrial situation, and cartoons depict the officers of corporations traveling upon the heights of affluence and the consumer in the cellar of poverty watching his meter measuring away his little substance and forming scarcely light enough to read the meter. That such trend of articles has become popular with the public press we all know, and we have all suffered from the suspicion and inherent antagonism which they have created. In every other form in which property manifests itself, except in shares of corporate stock, it has well defined rights and valuable privileges. Moneys invested in bank notes, or government bonds, or even real estate mortgages, are surrounded with legal safeguards to maintain their value, and if the hand of the despoiler for one moment seems to menace them everybody begins to talk about the sacred rights of property, and it is just as it should be. With the talent and ability at the command of this Association it would seem possible to explain the facts before the public that they will themselves protect the right that every investor has, whether his money has purchased a government bond or the bond of a gas and electric lighting company. In either case the proceeds are employed in the development of public business, except that in the lighting industry the constant public demand for more and more light of greater and greater candle power calls for a constant improvement in lighting appliances and the throwing away of expensive apparatus of a few years' service. This attempt of constant improvement tends to give the public not only what they think they need but demonstrate needs they were unaware of.

It is these conditions which create the immense depreciation account with which public service companies have to contend, and while the investor in the government bond can rest quietly taking his comfortable rate of interest the investor in the securities of a public service corporation has used his money for a development that is but little appreciated because it is but little understood. His real position is that while he not only serves a local public with a constantly improved method and quality of light his money has also been aiding the inventor in exploiting his improved appliances and in furnishing the manufacturer the market to keep his labor employed on the manufacture of new and improved appliances. It is this investor whose money has brought the mechanical appliances to such a state of perfection that to-day our country finds a market all over the world—the whole country has had the benefit of the risks and chances taken by the man who has lightened the "white man's burden," and if within recent years some of the gas and electric light companies have proved to be good income earners it is because these companies are meeting the public ends for which they were organized, because they have studied and facilitated the public interests and needs, because they have put themselves in advance of general development and at a vast expense have introduced new methods, new machinery and constantly improved the general lighting conditions. All this has been done at a vast outlay of intelligent energy and expense, and because the corporations have now created an article that all demand so universally that it has been named a public utility, and the demand in its now perfected state is such that some companies are reaping a reasonable reward for the results of their labor and risks of investment; for such public service the individual would receive the iron cross, but the corporation only gets the "double-cross," and the companies are constantly menaced by broken contracts, increased taxes and other burdens, for through years of toil, labor and expense they have made it a possible condition to give the public something they want in the way they want it.

There is another side to all this, from the viewpoint of the small investors whose number is legion, and who through the local bond and trust companies have in the past 10 years made in the aggregate immense investments in public service companies, which investments were all made upon terms and conditions expressed in a charter or a certificate of incorporation under a general act. These shareholders have a moral and it should be a legal right that the understanding as to what they are to pay or do under the terms of the franchise is nothing more or less than the conditions of which they had notice and to which they had agreed.

In the united dissemination of comprehensive information there is certainly a great work for this Association. Handled properly, the true position of public service corporations upon the industrial stage can be brought out and our acts subjected to the limelight of public scrutiny before a raised curtain so that the public may learn that what we give in service and the costs to us are elements entitled to consideration in the making of a contract, and the contract once made should no more be subject to repudiation than any other contract where the obligations have been complied with. The scope of dissemination of information is so wide that I fear I shall trespass upon your time too much; and so before I close there is one other suggestion as to a condition confronting this Association, which is the tax burden.

Taxation.—You have probably noted that President Roosevelt in his address at Milwaukee spoke upon the advisability of securing uniform taxation laws for public corporations and advocated that help be procured from the companies. What body could collect the data upon taxation and so clearly define a true basis of taxation as the Empire State Gas and Electric Association? This subject certainly merits your thoughtful consideration. At present there is the franchise tax, tax on gross receipts, tax on real estate, and tax on personal property, such as meters, etc.

An enormous amount of money is invested in the various lighting and power industries, a large percentage of which is sunk in the depreciation of values in demonstrating the practicability of new apparatus and methods, the benefit of which the public at large has inherited and for which under the franchise tax we are now assessed. That corporations should pay their just proportion of taxes no one will deny, but there should be no discrimination.

When by federal legislation it was proposed to tax the income of individuals, although a limit was placed which protected the poorer classes, public protest made itself felt so powerfully that the Supreme Court of the United States, after holding that an income tax was lawful, proceeded to reverse itself and to find constitutional objections that absolutely killed the income tax law, and yet an income tax upon the earnings of corporations is found on the statute books of many of our commonwealths and corporations with which the State has made definite contracts, fixing and limiting the obligations on either side, are required, notwithstanding these contracts, to pay other and additional taxes upon their gross earnings. There is no reason why we should not stand up for our rights as shareholders in the same sturdy spirit which we would in the defence of our rights as individuals. It is certain that much good could be accomplished by this Association in endeavoring to secure uniform tax laws, and to this end secure the co operation of the New York Tax Reform Association and the experience of the Ohio Association which has outlined a very attractive and practical method for tax assessments; in fact, several of the Middle-Western States are taking up these very problems and offering what seems to be a practical solution.

A duty of the Association should be to create a bureau of comprehensive information on taxes, municipal ownership, effects of competition, etc., and to put this information into such intelligent, concrete form as would allow the matter to go to certain committees who would, by the aid of the combined intelligence of the Association, work out the practical solution of this problem. This Association now embraces both gas and electric companies, and the probabilities are that in the near future it will affiliate with other State institutions with interests in com-

mon, just as the national banks, manufacturers and street and steam railroads have their organizations to foster and protect their mutual interests. It is certain that great assistance can be rendered members of this Association in matters before the State Commission, and in this respect the ability and expressions of the members from all parts of the State can be brought out to assist in working out the theories to facts and making some of the unsolved problems that will come up in the near future into practical operative conditions.

Legislation.—I think it is the sentiment that this Association can only take up the questions of legislation that directly affect the business, and that can be openly discussed at its public meetings, and from time to time endeavor to obtain a just interpretation of such laws as the employers' liability law and a proper regulation of electric wiring and construction.

Affiliation.—A particularly important aspect of the State Association is its connection with the National Association. The tendency in recent years has been to combine national and local associations of the same kind and to form a federation of associations which will obviously produce a great saving in expense and in effort. By this means all useless matter will be eliminated from the transactions of the National Association and all information will be classified according to territory and standardized by States. It is expected that within a short time this Association will be affiliated with the National Association as a part of this general scheme.

To maintain lighting companies and give efficient service requires not only capital but intelligence and skill, and each local company has had an organization to conduct its local departments, but with the present tendency of combinations of public utilities and the ever broadening and widening of the scope of service it becomes necessary that in commercialism, competition, taxes and proper interpretation of the law, that there should be some active bureau with a wide and unprejudiced organization that can with the available material in this State define the working policies so that each individual unit will be a unit of energy for the general good in the State aggregation.

Association Work.—In closing I would like to read from a paper read before the Gas Congress, St. Louis, 1904, by Mr. Henry L. Doherty, entitled "Gas Association Work," the following requirements for an ideal Gas Association:

1. Under proper conditions there should be one and only one Association of national or international character.

2. This Association should have members from every gas company, including practically all officers and ambitious employees, and should also embrace those men doing gas engineering work, whether in connection with gas engines or other industrial gas apparatus.

3. This Association should have ample funds for prosecutiag work for the benefit of the gas fraternity in general.

4. The Association should have suitable and permanent headquarters, and in view of the fact that all of the large engineering societies make their headquarters in New York city, these headquarters should be in New York and preferably in the proposed Union Engineering Building

5. Local sections should be encouraged on something like the plan adopted by the American Institute of Electrical Engineers, and these local sections should be furnished with gas literature and other papers for discussions, and should be encouraged to meet frequently.

6. Monthly meetings should be held at the headquarters of the Association and locally by the local sections.

7. The Association should designate such subjects upon which desirable knowledge is lacking.

8. Great efforts should be made to locate all persons capable of becoming contributors to Association work and to encourage them to contribute.

9. Means should be devised to encourage study and individual imimprovement amongst the gas fraternity.

10. Our literature should be analyzed, classified, indexed and revised, and if necessary rewritten, for the sake of putting it in more available form.

11. The Association should devise methods for encouraging investigation and research work.

12. Professional educators, engineers and scientists should be made interested in our work and if possible induced to contribute to our literature.

13. The Association should define what constitutes a gas engineer, and should take steps to establish gas engineering as a recognized profession.

MR. FRED. A. HALL is no longer in the service of the Haverhill (Mass.) Company.

Lead Covered Wiring.

[By Mr. JOHN D. MACKENZIE, in *Elec. Review*, London.]

The wiring problem—like the poor—we have always with us—either in the description of a new system or the acclaiming or declaiming of an old one. But of all the various systems—and they are legion—lead covered wiring is, perhaps, the one on which we have the greatest diversity of opinion, the advocates of the system being quite as dogmatic in their support of it as its opponents are in denouncing it. Yet really, when all is said and done, there is no system of electric wiring which can be regarded as a universal panacea for the ills that electric wiring is heir to, and so finally, it comes to be a case of adjustment of pros and cons in order to decide which system is the best for each particular instance. If wiring contractors and consulting and municipal engineers could study each case absolutely on its merits, without any predisposition or bias, and recommend the system best suited to meet all the circumstances, the quality and durability of electrical installation, as a whole, would be instantly put on a higher level than it is at present.

In the following remarks I shall endeavor to place the advantages and disadvantages of lead covered wiring side by side, and show how some of the disadvantages may be minimized.

Advantages.—1. The wire comes to the contractor, already provided with its own continuous metallic sheating, and generally requires no further protection.

2. The sheathing is watertight, and the whole installation can quite readily be made so too.

3. The great flexibility of the wire enables it to be installed with much less damage to the buildings.

4. The small diameter of the wire enables it to be used in surface work where any other system would be an eyesore.

5. The difficulty of making joints practically compels the adoption of a loop-in system.

The disadvantages urged against the system are many and various, but fall under two general heads, viz.:

1. Risk of injury during erection.
2. Risk of injury after erection.

To that, some add the risk of injury during manufacture. This, however, with the exception of one point, is no greater in lead covered than in the ordinary taped and braided wiring. The one point of difference is in the heating to which the wires are subjected during the process of sheathing. Considering, however, the rapidity with which the wires are run through the lead press, and the tests which are afterwards applied to these cables, and which they successfully stand, the risk of damage seems very slight.

Before dealing more fully with the disadvantages attendant on the use of lead covered wires, it may be as well to point out that, personally I have no love for twin wires, either round or flat, considering it inadvisable to say the least, to run the chance of an internal short-circuit inside a short metal sheathing. It is far preferable to use single lead covered wires, with the lead sheathing properly bonded and earthed, because it then requires two "earths" one on each wire before one obtains a short circuit, and on public supply systems an "earth" on the live wire means the blowing of a fuse. For these reasons, I do not intend to deal here with twin wires.

The risks of injury during erection, arise from the carelessness of the wireman, and from the carelessness of other workmen.

The careless wireman cuts into the insulation when stripping off the lead sheathing; overheats and softens the insulation when sweating the sheathing into boxes for a watertight system; overlooks the pinholes caused by heated air bursting through the melted solder at such boxes; pulls the lead sheathing too hard, so making it brittle, and then it cracks when bent; hammers on his saddles are tight, and perhaps puts them on twisted, so cutting the lead by the edge of the saddle.

The carelessness of other workmen is shown—by the plasterer who cuts the lead with his trowel; the laborer who drops a shovel on it; the joiner who nails the flooring board to it; and by any man who walks with hobnailed boots over the top of it.

The risks after erection are:

(a) The lead gives very little mechanical protection, from nails, for example.

(b) It may be successfully attacked by rats and mice.

(c) If a failure of insulation takes place, a wire cannot readily be withdrawn and replaced.

(d) Lead expands with increase of temperature, and may not go back

to its original length when cold, and hence it may come in contact with other metals, or may even get cracked and broken.

(e) The electrical resistance of lead being high, contact with other metals may form a better "earth" than the proper earth connection.

(f) When an "earth" comes on, the lead may fuse at the point of contact as quickly as the fuse wire does.

(g) Pure water in the presence of air, and water containing salts in solution, such as ammonia, have a solvent action on lead.

(h) Decaying animal or vegetable matter under floors, etc., produces acetic acid, which, acting on the lead sheathing, has also a deleterious effect by forming "white lead."

(i) The presence of other metals, such as brass saddles in damp situations, causes electrolytic action.

(j) Where the lead sheathing is bared back to allow the wire to enter a switch or other fixture, there is a tendency for the current to creep on to the lead and escape at some other point, causing electrolytic corrosion.

The above list of defects, disadvantages, and possible risks of injury follows, with some variations, a very full arraignment of lead covered wires, and I take it to represent all, or nearly all, that can be said against the system.

The next point which arises is the question, "Is it possible to overcome or minimize the risks?"

Taking the careless wireman, it is quite possible to get careful workmen who will do none of these things; and, in any case, will a careless workman not cut into the insulation when removing braiding from ordinary wire—will he not twist and kink the wire when drawing it into conduit, will he not leave ragged edges on his conduit so as to tear the insulation, will he not attempt to draw too many wires into a conduit, so straining the insulation and breaking the strands of wires; in short, what will the careless wireman not do? Ergo, get rid of him as quickly as you can.

The risk of injury from other tradesmen is always present, and where lead covered wiring has to be carried out while a building is in course of erection, special precautions must be taken to avoid injury—*e.g.*, laying temporary boarding over the runs of wire on the floors, lapping up with tape where coming out through plaster work. etc.

The faults after erection make the most formidable list, but it is quite possible to minimize these considerably.

(a) This point is made a good deal of by the opponents of lead covered wiring, but seems to me to be grossly exaggerated. During the last 7 years I have only had three instances in which lead wiring was damaged through nails or similar articles having been driven through the plaster work.

(b) This again is much exaggerated. Rats and mice have teeth which can easily work havoc on lead wire, but they seldom do so, and my own personal experience supplies no instance. These rodents will only attack lead wiring or lead water pipes when in the direst straits for food or drink.

(c) This is the only point where conduit systems can show any real superiority over the lead covered. The usual method of lead covered wiring is to plaster it right in, and consequently it is impossible to withdraw it without damage to the plaster work. Several years ago the writer adopted the system of putting thin close joint tubing in such walls as would be plastered up solid, dropping the lead covered wires down this tube and drawing them taut, then placing an insulating bush top and bottom of tube, thus giving the advantage of a conduit system and also some more protection against an exploring nail.

(d) Here we have a fault not so much due to the lead covered wire as to its indiscriminate use. Where wiring is to be subjected to very great variations in temperature, lead should not be used, but the writer has never found the ordinary temperature changes in house or shop to have any appreciable effect on the lead sheathing.

(e) In order to overcome this all that is necessary is to bond all the lead wires together at frequent intervals, and so get the advantage of all the sheathing. For this purpose the writer uses a solder containing a large proportion of lead, and has found no trace of electrolytic action even in damp situations after years of use.

(f) The foregoing method of bonding the wires together tends to prevent the lead sheathing melting before the fuse does.

(g and h) The solvent effects of water with either air or salts in solution are certainly a possible disadvantage, but no more so than with thin enameled conduits, which rust through in a very short time. Except under very exceptional circumstances, the amount of acetic acid which can be formed by decaying matter will not seriously harm the average lead-covered wire.

(i) Electrolytic action between brass saddles and the lead sheathing may quite easily be overcome by the use of lead saddles, which are quite as efficient.

(j) The current creeping along the insulation and on to the sheathing and causing electrolytic corrosion, is also easily overcome by dipping the ends of the wires up to the sheathing in melted joint-box compound. This also helps to increase the insulation resistance of the whole job.

The faults which so often occur on lead-covered wiring are all due to carelessness in the workmen, or because the conditions under which the wire is to work have not been properly appreciated. And the advantages to be obtained by the use of lead-covered wire make it easily worth the time spent in considering all the necessary circumstances. An example of what not to do was given a good many months ago in a letter published in these columns, where lead-covered wire has been drawn into the iron gas pipes laid in the ground, with the inevitable result, viz., breakdown.

Here the lead covering was no doubt scratched, and perhaps cut while being drawn in, by the roughnesses inside the tube and then it lay touching the iron and perhaps surrounded by moisture, either leaking through the pipe joints or due to condensation inside the tube, thus giving the very best chance for electrolytic action.

No one knowing the limitations of lead-covered wire would suggest or carry out such an arrangement, instead of which the wire ought to have been laid either in wood troughing and pitched in solid, or drawn into smooth earthenware or concrete conduits. It is the adoption of such obviously foolish arrangements, as indicated, which has given lead-covered wiring a name for want of reliability, and I trust the foregoing remarks may indicate, in some small measure, how to overcome some of the difficulties.

Fire Tests with Concrete aud Reinforced Concrete.[1]

Following so closely upon the publication of the new fire office rules in respect to reinforced concrete, as commented upon in our issue of October 6, the fire and water tests conducted on October 24 and 25 by the British Fire Prevention Committee are of purticular interest, and the more so as they appear to fully prove the case of the fire insurance surveyors in requiring special safeguards where reinforced concrete construction is adopted.

The Concrete Aggregates Tests.—The first of the Committee's tests was with a floor (22 feet by 10 feet) comprising 7 separate bays of concrete, the bays being supported by ordinary 6-inch rolled iron joists incased with concrete. The concrete aggregates utilized for incasing the joists were identical throughout—namely, a coke breeze concrete (5 to 1)—but the bays were each made with a concrete of a different aggregate for the purpose of obtaining comparative results. Each bay showed an exposed surface of 10 feet by 2 feet 7 inches and was 5 inches thick, and the bays comprised respectively slag concrete, broken brick concrete, granite concrete, burnt ballast concrete, coke breeze concrete, clinker concrete and Thames ballast concrete. In each case there was 1 part of Portland cement to 5 parts of other substance. Thus there was 1 part of cement to 3 parts furnace slag and 2 parts of sand in the slag concrete; 1 part of cement to 3 parts of broken brick and 2 parts of sand in the broken brick concrete; 1 part cement to 3 parts of broken granite and 2 parts saud in the granite concrete; 1 part cement to 3 parts furnace clinker to 2 parts sand in the clinker concrete; 1 part cement to 3 parts Thames ballast and 2 parts sand in the Thames ballast concrete; while the burnt ballast and coke breeze concrete were of 1 part cement to 5 parts of burnt ballast and coke breeze respectively. The concrete aggregates were put in fairly wet, the time allowed tor setting and drying was 6 weeks, and the bays were loaded at 2 cwt. per foot super.

The test to which the concrete bays were subjected was the application of fire for a period of 3 hours, gradually increasing in temperature to over 1,800° F., followed by the application of water from a steam fire engine for 2 minutes.

Pending the usual official illustrated and detailed reports issued by the Committee, of course, only a general idea of the result can be recorded; but the importance of the subject is such that even this general idea should, to our mind, be published immediately. Thus, speaking generally, it has certainly been fairly proved that Thames ballast concrete is most unsuitable for fire resisting purposes. Of the various bays the Thames ballast concrete bay was certainly the failure, and this although, as should be specially remarked, the Thames ballast had been passed through a 1½-inch ring, whilst, as a rule, Thames ballast, as used in concrete, is somewhat larger in size. The concrete was

1. *Engineering.*

broken away, was disintegrated, and the bay deflected 2 inches in the 2-foot 7-inch span, at the same time being badly cracked all over.

The two great successes in the ordeal were, in our opinion, the clinker and the coke breeze concrete. Next in order of success were the broken brick concrete and the furnace slag concrete, the slag being from some iron works in Northampton, bought in the ordinary way through a builders' merchant.

The broken granite concrete was more successful than one would generally anticipate; but this was due mainly to the safeguard that all granite was put through a ¾-inch ring, which practically means that the granite was what the trade generally terms "granite chips." The burnt ballast concrete did not appear at all satisfactory, though by no means as bad as the Thames ballast concrete.

Speaking generally, concrete as such has certainly scored a very great record in these tests. It was well known, of course, that concrete is a most useful fire resisting material if of proper aggregate and properly applied, but that it is necessary to differentiate nicely between the different aggregates. But what has however been particularly proved, further, in respect to these concrete aggregates is the great advantage of using a first-class cement, and it would thus be well to mention that the cement used in all the bays was identical, and was cement made by the Associated Portland Cement Manufacturers, Limited, known as "ferro-crete" cement. This cement is of very fine grinding, the residue on a sieve with 32,400 meshes per square inch not exceeding 14 per cent. The minimum of expansion in this cement does not exceed 2 millimeters under the Chatelier test, and the tensile strength was considerable, both in the neat cement test and sand test. Had it not been for the excellence of the cement, all the bays must have made a worse showing under such a severe ordeal of fire and water, and no doubt both the Thames ballast and burnt ballast bays would have collapsed. At a time when so many complaints are being heard of the importation of foreign cement described as Portland cement, and although manufactured abroad, actually bearing trade descriptions not dissimilar to the English trade descriptions, a word of warning should again be particularly sounded for architects and engineers to thoroughly assure themselves that the cement used in concrete and armored concrete building work should be British cement of the finest kind, preferably made in Kent or Essex. These tests have, indeed, gone far to prove the importance of the quality of cement for concrete aggregates, and the lesson should be appreciated to its full importance.

The Reinforced Concrete Test.—The Fire-Prevention Committee's second test, that was undertaken on the 25th ult., was with a reinforced concrete floor on the Coignet system, this special floor attaining classification under the Committee's standard as "fully protective" (Class A), which means that it withstood a test of not less than 2½ hours' duration at temperatures rising above 1,800° F., followed by the application of water for 2 minutes, the floor being under a load of not less than 2 cwt. per square foot. As a matter of fact, the test was extended to 3 hours, and the load was somewhat higher than required under the standard—*i. e.*, 2½ cwt. per foot.

The Coignet system is too well known for general constructional work to require special description here, excepting perhaps to point out that it lends itself particularly to fire-resisting construction, owing to the strength of the upper members in the horizontal beams, a point of considerable importance whan the lower members become affected by the impingement of flame.

The floor covered a testing chamber measuring 22 feet by 15 feet, and was divided into 3 bays. The concrete aggregate was clinker concrete, in which the same "ferro-crete" cement was used as referred to above, and the cement again being provided by the Associated Portland Cement Manufacturers, Limited, 6 weeks being allowed for setting and drying.

The theory put forward by those best conversant with the subject of the fire resistance of armored concrete, and so recently developed in the Fire Office Rules, was practically demonstrated, for it was shown that great care must be taken with the protection of steel rods, even if a clinker concrete aggregate is used, as was the case here. The Fire Office Rules are certainly not too stringent when they require 2 inches of protection around the bars of 1 inch thickness and upwards, and a protection equal to twice the diameter of a bar for the thinner members, the minimum protection being 1 inch. As a matter of fact the minimum protection should be 1½ inches.

We think it most politic on the part of the Coignet management at Paris to have undertaken this investigation here in London, for what with the miniature private test by the representative of another French ferro-concrete system in March, 1904, and the failure with the Swiss hollow girder ferro-concrete floor tested by the British Fire Prevention Committee some two years ago, it was time that a first-class firm should demonstrate that if due care be observed in the design, and a proper aggregate used, reinforced concrete has a very considerable advantage from a fire resisting point of view. If the latest fire office rules are fully observed, we see no reason why the highest classification should not be obtained by the Coignet floor system—namely, that of the 4-hours' test, with 5 minutes of water; and such classification would, indeed, be valuable to the whole movement towards reinforced concrete construction.

Generally speaking, the Committee's recent tests with concrete should be considered a boon by engineers and architects, for they definitely indicate the pitfalls that should be avoided in concrete and reinforced concrete construction, and they prove why the Fire Office Rules should be strictly adhered to. The tests are, no doubt, only the forerunners of further investigations, but the results obtained will warn our dock and harbor engineers, as also the Royal Engineers, that they must not allow the concrete contractors to neglect the fire question, as has been the case recently in several notable instances. The Associated Portland Cement Manufacturers and M. Coignet, of Paris, are to be congratulated upon the public spirited way in which they have taken up the matter. For first-class firms to break down mere traditional opinion and rule of thumb by proving plain facts, whilst not themselves being monopolists, does great credit to them.

As to the conduct of the tests, they were on the usual well known lines, and thus require no comment, except, perhaps, to mention that the sub-committees in charge of the work were carefully selected as representative of the technical interests involved, and that the attendance at the tests was considerable, including many officials from our public departments.

The sub-committee in the first test comprised:

Mr. Max Clarke, F.R.I.B.A. (directing member); Mr. J. Herbert Dyer (Vice-President, National Fire Brigades' Union); Mr. Walmisley, M.Inst.C.E. (Dover Harbor Board); Colonel Winn, R.E.; Mr. E. J. A. Fulkes (Royal Insurance Company); Mr. Matt. Garbutt, A. M. Inst. C.E. (surveyor, Metropolitan Railway); Mr. Dicksee, A.R.I.B.A. (London district surveyor); Mr. Grellier, F.R.I.B.A. (London district surveyor): Mr. Wylson, F.R.I.B.A.; whilst Mr. J. W. Restler, M.Inst. C.E. (deputy chief engineer, Metropolitan Water Board) supervised the water arrangements.

The sub-committeee on the second test comprised: Mr. Ellis Marsland (London district surveyor), directing member; Mr. J. Herbert Dyer (Vice-President, National Fire Brigades' Union); Mr. Garbutt, A.M. Inst.C.E.; Mr. James Sheppard, A. Inst. E.E. (North British and Mercantile Insurance Company); and Mr. Percy Collins (insurance expert); whilst Major-General Festing, C.B., F R.S., and Mr. W. T. Hatch, M.Inst.C.E. (Metropolitan Asylums Board), and the Chairman of the Executive represented the Council of the Committee for the general arrangements of the testing operations.

The Naval Electrician.[1]

The idea of becoming a naval electrician probably appeals to a good many lads who have some knowledge of electricity, and fancy the prospect of going out into the world on board a man-of-war; to not a few of these the uniform is, perhaps, an attraction, with its peaked cap and brass buttons savoring of the full blown naval officer.

Far be it from us in any way to discourage a feeling of pride in the uniform of either of the services, for it is surely a pardonable form of vanity that brings out such qualities as are needful "for the sake of the cloth."

However, it is but fair to point out to those who may only have seen the shore-going side of life, that there is a good deal beyond the peaked cap and the high sounding title of electrician, which does not appear on the surface.

To begin with the title electrician is, perhaps, a little misleading, for it would seem to imply that the holder of it is responsible for, and generally in charge of the electrical plant on board ship. One might be led to infer that his opinion on electrical matters would have considerable weight, and that he was, in fact, more or less of a "boss" in his own particular line.

Now, as a matter of fact, the electrician is not an officer at all in the naval acceptance of the word; he is a mechanic pure and simple, supposed to have special knowledge of the sort of work required in the adjustment and repair of electrical instruments.

The electrical engineer of the ship is the torpedo officer, whether he be a warrant officer or a lieutenant appointed for those duties; his

1. *Electrical Review*, London England.

right hand man is the torpedo instructor, a man who has entered in the ordinary line and has taken up the torpedo branch in preference to gunnery.

The electrician occupies rather the post of instrument maker, though his actual duties in a great measure depend on his special aptitude for certain kinds of work as observed by the torpedo officer.

As an example, let us take a battleship or large cruiser, and see in what manner the work is generally divided up, and what duties in particular will be likely to come under the care of the electrician. To do this we must endeavor to place ourselves in the position of the torpedo officer, and see what arrangements are best suited for the disposal of the staff under him.

As regards the work that it is his special duty to supervise, it may be divided first of all into two great items—the illumination of the ship and the efficiency of the Whitehead torpedo armament.

His staff will probably consist of 2 electricians, 2 torpedo instructors, a few permanent ratings in the torpedo branch—some half dozen or so—and any men that the commander may be able to spare for special work that is in hand and requires what one might call unskilled labor, such as the cleaning of torpedo tubes and such minor odd jobs.

The half dozen or so permanent "hands" would be called the electric light party, and the bulk of them would be employed going round chasing earth leaks, repairing circuits and renewing lamps wherever necessary.

A responsible man must be in the neighborhood of the switchboard, another reliable man should be in charge of the electric light party, a third is required to look after the bells, batteries and telephones.

Now all these men have their own little calls upon the electrician's workshop; they go round and gather up the fragments of misapplied ingenuity which follow in the wake of untutored ambition.

There are switches which have suffered from some burly autocrat who did not realize that the current was broken at the sectional box galvanometers which have had their faces slapped and turned sulky, other instruments which have displayed a marked antipathy to sea water, and a host of minor fittings with which sea air does not agree.

All these things claim the attention of the electrician and test his skill as an artificer in brass, but they do not, as a rule, require any great technical knowledge. The electrician whose duty it may be to attend to these items has his hands full, and it is always easier to write up the defect book than to write the items off.

But, besides electric work, the torpedoes claim a large amount of the torpedo officer's attention; men must be detailed to look after these, and a specially skilled and neat workman must attend to the gyroscopes, upon which the straight-running of each torpedo depends.

A gyroscope consists essentially of a perfectly balanced heavy flywheel, running on ball bearings.

Now, everyone who has possessed a bicycle knows that it requires a definite amount of force to turn the front wheel when it is set spinning rapidly in the air; it is precisely this force that is made use of in the gyroscope when the little flywheel is set revolving, and the resistance to any turning movement is made to act upon valves which control the rudders.

This little instrument, which forms an integral part of each torpedo, is exceedingly sensitive, and at the same time it is of the utmost importance that it should be accurate.

Who better than the electrician with his skill in handling delicate instruments for the job? So it comes about that electrician No. 2 becomes a specialist in the art of gyroscope adjusting to the exclusion of almost any kind of electrical work whatever.

Now, to the man who has taken up electricity as a study, who has studied the theory of it, and perhaps prides himself on his electrical certificates, this may, possibly be decidedly disappointing; he had, perhaps, visions of wireless telegraphy, and the large field of investigation that this branch of the subject throws open to the inquiring mind; he had pictured himself in charge of a ship's installation with all its ramifications, the ball systems, telephones, telegraphy, lighting, battery work, dynamo and motor work and all varieties of testing; his certificates are a guarantee of his right to an opinion, and his title would seem to invite it, but he finds himself instead tied down to his lathe, making endless terminals and ebonite bases, carrying out routine orders, and consulted in nothing; there is another in the place that he thought to occupy, and he is not even this person's deputy, for there are torpedo instructors whose official certificates entitle them to a higher place.

It may not always be so—in fact, it is probable that there will be great changes in the near future—but for the present we would point out the advantages of working up through the regular line where it is a case of ambition, for the torpedo instructor becomes eventually a torpedo officer, and, in due course, may even get a commission.

The naval electrician is, however, not at all badly placed when once he realizes his true position: as an instrument maker no one can touch him; he is master of his craft, and as such will earn the confidence of his officer. Once this is established it is not likely to be forgotten, and he will be looked upon as a man of no small importance.

Electricity is more or less of an innovation in the navy, and it is daily growing in importance. The electricians, as a body, must remember that the engineers started in much the same way, only with more prejudice against them; within the last few years recognition of their merits has come to them in rapid strides, and there would seem some likelihood of considerable changes being effected in the electrical branch.

Torpedoes and the electrical plant have little in common; the link was first welded in the adoption of electrically fired mines, when the torpedo officer was the only individual who was supposed to be sufficiently well acquainted with the fact that electricity can only travel along a metallic circuit, and is held there by the surrounding insulation through which it cannot pass.

In these days of high frequency currents, specific inductive capacity, self-induction, and so forth, he has to know a good deal more, and modify the views of his predecessor considerably; leaving out his executive work, leaving out even his Whitehead torpedoes, he has still quite enough to worry him as an electrical engineer, and the day is probably not far off when, putting aside his other duties, he will assume the latter sobriquet alone.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE McGraw Publishing Company, of New York, announces that January 1st the *American Electrician* and the *Electrical World and Engineer*, will be consolidated under the title of the *Electrical World*.

AMONG other betterments being made at the plant of the Dauphin County Gas Company, of Steelton, Pa., we may mention 2 benches of half depth sixes, that are being constructed by the Laclede Firebrick Manufacturing Company, of St. Louis, Mo.

AT the annual meeting of the Consumers Gas Company, of Johnstown, N. Y., the officers elected were: Directors, Charles S. Price, Joseph Morgan, John D. Roberts, H. H. Weaver and John B. Lowman; President, Charles S. Price; Vice-President, Joseph Morgan; Secretary, Frank Howard.

THE *Manufacturer's Record*, of Baltimore, Md., says that the Iola (Kan.) Portland Cement Company has ordered from the Westinghouse Machine Company of East Pittsburgh, Pa., three 500 horse power horizontal double acting gas engines and one 125-horse power vertical single acting gas engine to increase the capacity of its already large gas power plant. The 3 horizontal gas engines now on order will be the first of this type to be installed in the power house, the remainder being of the vertical type. After the installation of the engines now on order the power equipment will comprise 15 engines of the Westinghouse vertical single acting type and 3 of the horizontal double acting type, aggregating about 4,500-horse power. The Company operates its plant upon Kansas natural gas fuel, and is one of the largest users of gas power in the cement manufacturing field. The engines are used to operate various classes of machinery, such as rock crushers, rotary kilns, line shafting and generators for supplying power and light throughout the works. The machinery is in general arranged in groups upon sections of countershafting driven by a single engine either direct connected or rope driven. It is stated that in point of size this installation has few precedents, and its successful operation under such severe conditions demonstrates the many advantages of gas power in industrial establishments of all kinds.

"R. F. J." writing from La Crosse, Wis., under date of November 30th, incloses the following: "Illuminating gas at $1 per 1,000 cubic feet. This is the quotation made by the La Crosse Gas and Electric Company to take effect December 1st. The official announcement of the reduction was issued recently. The reduction is one of 33⅓ per cent placing the price of illuminating and fuel gas on the same plane. The circular sent out by the Company announcing the cut says: 'Following the reduction of 25 per cent. in the price of electric light announced last month, this Company further announces a reduction in the price of lighting gas from $1.50 to $1 per 1,000 cubic feet, a reduction of 33⅓ per cent. That is, all gas whether used for illuminating or fuel will be sold for $1 per 1,000 feet net to all consumers paying their bills by the

10th of the month. This reduction to take effect for all gas consumed after December 1, 1905.'"

THE new storage holder for the Lynn (Mass.) Gas and Electric Company, which was constructed by Messrs. Bartlett, Hayward & Company, of Baltimore, Md., is completed. It has 4 lifts, and rests in a steel tank, and has a capacity of 2,013,000 cubic feet. This addition to the plant of the Lynn Company enables it to safely count on a storage reserve amounting to 3,300,000 cubic feet.

WRITE to the C. W. Hunt Company, New York City, for a copy of its new catalogue, No. 0510, which has for its subject an illustrated description, etc., of the "Hunt" Automatic Railway.

THE City Council of Granite City, Mo., has adjusted its differences on public lighting account with the Granite City Gas Light and Fuel Company. A contract satisfactory to both has been agreed upon, and the service thereunder is to commence the 1st inst.

DURING the last week in November, at a meeting of the Canadian Tariff Commission, sitting in Hamilton, Ont., Mr. D'Arcy Martin, representing the Hamilton Gas Light Company, petitioned that the duty on bituminous coal used for gas making be removed, failing which action that a sensible duty be imposed on imports of tar, coke and the like bye-products.

WE are informed that the El Reno (Okla.) Gas and Electric Light Company has been incorporated by Messrs. George J. Hickox and F. N. Howell, of Reno; M. G. Clark and Milo D. Campbell, of Coldwater, Mich., and H. H. Stanton, of Brookfield, Mo. It is capitalized in $150,000.

A CORRESPONDENT in Savannah, Ga., informs us that Mr. J. H. Haggerty, of Americus, Ga., has made application to the Council of Albany, Ga., for the right to there construct and operate a gas plant. It is likely, adds our informant, that the franchise will be granted, despite the fact that the city owns and operates an electric lighting plant, from which it derives a handsome profit.

THE proprietors of the Los Angeles (Cal.) Gas and Electric Company have issued the following notice: "In accordance with our established custom of lowering the price of gas at every opportunity, we will, on January 1st next, make a further reduction of 5 cents per 1,000 cubic feet." Think of that rate (which means 85 cents per 1,000) for gas in a California city!

THE following notice, which explains itself, was issued a few days ago by Mr. Frank E. Holden, President of the Woonsocket (R. I.) Company, to the residents: "Commencing with the January bill, presented in February, the price of gas will be at the rate of $1.45 per 1,000 cubic feet up to 5,000 cubic feet a month, $1.40 per 1,000 cubic feet from 5,000 to 10,000 cubic feet a month, $1.35 per 1,000 cubic feet for 10,000 cubic feet or more, and a cash discount of 10 cents per 1,000 cubic feet will be made from above prices to consumers who pay their bills on or before the 10th day of the month. When the 10th day of the month falls on Sunday or a legal holiday, the discount will be extended to the close of business the 11th." Up to the present time the scale has been $1 60 with 10 cents per 1,000 cash discount if bill is paid before the 20th, and these rates have been without regard to quantity or whether gas was used for fuel or illuminating.

THE Springfield (Mass.) Gas Light Company has arranged that its customers may pay their bills at branch offices of the American Express Company instead of at the main office of the Gas Company. The accounts must be settled before the 10th day of each month, and these charges will be made for the accommodation: Less than $5, five cents; from $5 to $10, eight cents; from $10 to $20, ten cents.

THE Atlantic City (N. J.) Gas and Water Company's contribution to the 2 per cent. franchise tax on all public utility corporations that in the operation of their respective businesses require the use of the streets amounts this year to $4,346.38. It is the highest taxpayer on the list. In fact, there are 11 contributors, and the total contribution is $11,549.17, wherefore the Atlantic city gas men pay well over one-third of the total.

MR. RALPH S. CHILD, of Grand Rapids, Mich., has agreed with Mr. Gascoigne, Manager of the plant at Mattoon, Ills., that the latter would show better results if some betterment was made thereon. Mr. Child is likely the largest owner of shares in the Mattoon concern.

MESSRS. B. SMITH, H. C. Bancroft, F. D. Lyon, J. R. Looney and S. J. Rice have incorporated the Brownwood (Tex.) Gas Company. It is capitalized in $60,000. We fail to see where the need for a gas plant in Brownwood is urgent just now.

MESSRS. O'CONNOR & KAHLER, bankers of New York, Chicago, Providence and Dallas, Tex., are offering to investors $600,000 of the Dallas Gas Company's first mortgage 5 per cent. gold bonds, due in 1925, interest payable May and November in New York, and redeemable at 105 and interest. The price is 101 and interest.

MENTION of Dallas puts us in mind of the fact that certain speculators have applied to the City Council for a franchise for an opposition gas works. It is not probable that the franchise will be issued.

THE Portland (Ore.) Gas Company proposes to extend its main system to Mount Tabor Heights and Montovilla as well.

A CORRESPONDENT in St. Louis, Mo., writing under date of the 2d inst., says:

To the Editors AMERICAN GAS LIGHT JOURNAL: In his recent book entitled "Humanism," Mr. F. C. S. Schiller, the leading European exponent of the new cult of so-called "Pragmatism" (alias, commonsensism; alias, I should say Prof. B. H. Meyer's "Relativism") engages one important cog which Prof. Meyer in his governmental philosophy seems to slip. Speaking of the tendency of political economists to take their "principles" too seriously, Schiller says: "Alike in ordinary life and in science we are almost without exception given over, not to the adoration of an unknown God, but to the worship of forgotten abstractions and methodological fictions, and happy is he who can avoid bending his knee to such bogeys." And this idolatry leads to terrible confusions, as these very cases show. When the "economic man" is taken seriously, and made a practical ideal, he leads to results which are incompatible with the maintenance of political and social cohesion, and with the sanctity of moral laws. And he provokes a reaction even worse than himself in the direction of revolutionary socialism. Now, I surmise Prof. Meyer would resent the imputation of such idolatry, but his lecture before the late Milwaukee convention of the American Gas Light Association suggests the inquiry whether he has not after all, and practically speaking done as ill as any out-and-out bogey worshipper. I am one of those who believe that political view has been and is and always must be a blunder. This view is too unpopular to receive serious consideration, so I will keep that opinion to myself and remark only that I experience this difficulty in connection with Prof. Meyer's tripartite theory of government. Namely, that I discover in our social midst no criterion, no adequate tribunal, indeed no conceivably adequate tribunal, to which we are to refer the interesting and ubiquitous question of the *proportions* of the several "principles" to be incorporated together in any given case. If there were any way by which one could tell when and how to mingle these principles it would be quite another matter; but our notorious and eternal inability to do more than to guess is the fact which to a few still ossified minds like my own makes forever hopeless and a blundering the whole attempt at "economics." For, consider: If we adopt Prof. Meyer's view, and we find upon trial that there is no criterion for the mixture of the three elements except the private judgment of ourselves and those who happen for the instant to share our judgment, we seem to be turned over to government by haphazard. And between this theoryless affair and the practice which more and more obtains in these United States there is an intimate connection the remarking of which to-day quickly earns a man the reputation of "fanatic" and "dreamer." And yet Prof. Meyer, along with every economist and every plain man, and every "fanatic" who cuts the "economic man" dead, acts invariably as if he regarded himself as an individual and not as a mere cog in the social mechanism. If any of the above gentlemen were to practice what they preach about the dubiety of our sense of the primal worth of our individuality he could not live the day out. Let science and philosophy say Aye or Nay. We *do* base our little all on the principle of individuality, and we have a warrant for using the term principle in this basic way which the economists can never have for their use of the term. The warrant, I repeat, is that we *must* act as if the fact and the worth of individuality were the basic principles of life, or we shall surely die. For myself that test is conclusive, and Prof. Meyer's "principles" when tried by that test go all to pieces. Most men to-day it would seem have forgotten that theory (*i.e.* principle) is one thing and practice quite another. Our theory of individuality is the ideal, the goal to aim toward, but which

(*Continued on page* 979.)

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, DECEMBER 11, 1905.

(*Continued from page* 978.)

our commonsense tell us cannot ever, in its perfection, be the rule of actual conduct. Our governmental practice must be, as Prof. Meyer seems to intend to say, an imperfect relative pragmatical affair, but to infer from this to the conclusion that, therefore, our practice knows and has need of no absolute working theory by which to arietate itself and thus rationalize itself, is to be guilty, to all practical intents and purposes, of that "idolatry" which, as we know to our current sorrow and humiliation, leads to such "terrible confusion." If these premises have any soundness, then nearly all municipal ownership has none. Men seem to us fanatics and dreamers amazingly slow to comprehend that their differences in social and governmental matters to-day are mainly at the root and not in the branches of the subject.—Very truly yours, S. M. DOAN.

The Market for Gas Securities.

The market for city gas shares was all to the bad this week, despite the fact that general speculative stock trading was good, so far as quotations went. The uncertainty as to what the outcome of the hearing before the State Commission regarding price and quality will be undoubtedly had to do with lower prices for local gas shares, but why this should be so is hard to comprehend, since the Commissioners have been going about their work deliberately and without fuss. Consolidated closed at 175½ to 177. Brooklyn Union was 175 to 180.

Peoples, of Chicago, is 105⅞ to 106; Baltimore Consolidated is 85½ to 87, and Cincinnati Gas and Electric is 105½ to 106. Laclede preferred is bid 95, holders asking 110.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

DECEMBER 11.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies	Capital.	Par.	Bid.	Asked.
Consolidated	$73,177,000	100	175½	177
Central Union, Bonds, 5's	3,000,000	1,000	108	110
Equitable Bonds, 6's	1,000,000	1,000	..	105
" 1st Con. 5's	2,300,000	1 000	118	120
Mutual	3,500,000	100	275	290
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co.. Bonds, 5's	11,000,000	1,000	111	114
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	41
1st Mtg Gold Bds. 5 p. ct.	1,000,000	..	98	104
Northern Union, Bonds, 5's	1,250,000	1,000	105	107
New York and East River Bonds 1st 5's	3,500,000	1,000	112	114
" 1st Con. 5's	1,500,000	..	106⅛	108½
Standard	5,000,000	100	140	160
Preferred	5,000,000	100	155	175
Bonds, 1st Mortgage, 5's	1,500,000	1,000	111	114
Yonkers	299.650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	175	180
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	3/16	¼
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000.000	1.000	47½	50
Buffalo City Gas Co.	5,500,000	100	10	12
" " Bonds, 5's	5,250,000	1,000	75	80
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	105½	106
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	90	..
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	..	95
Preferred	3,026,500	100	107½	103
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	85½	87
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000		101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	110	112
" Bonds, 5's	10,500,000	..	110	110½
Indianapolis	2,000,000	..	60	70
" Bonds, 5's	2,650,000	..	104½	105
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	200,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100		
Preferred	2,500,000	100	95	110
Bonds	10,000,000	1,000	108½	109
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1 000,004	1,000	60	65
Louisville	5,570,000	50	143	145
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	137	138
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	105⅞	106
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	104½	105½
San Francisco, Cal.	15,800,000	100	58¼	58¾
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	..
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¼	..
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047 000	1,000	102	..
Washington, D. C	2,600,000	20	300	301¼
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600.000	50	230	.

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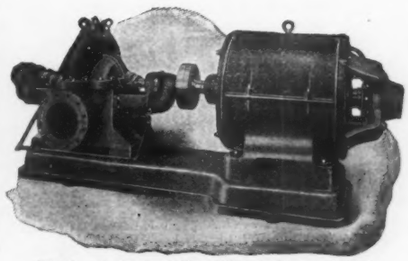

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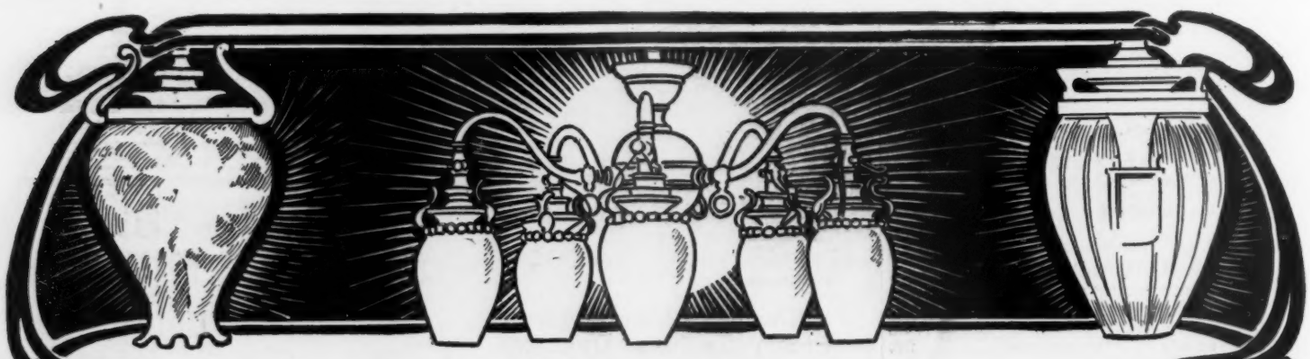

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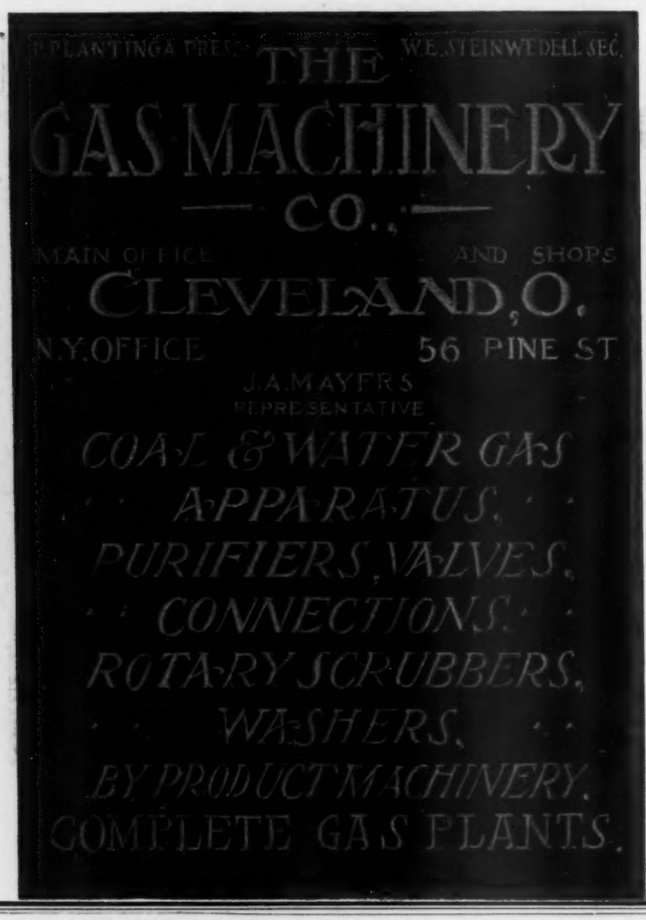

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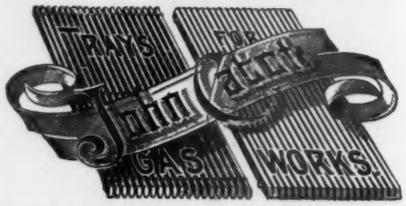

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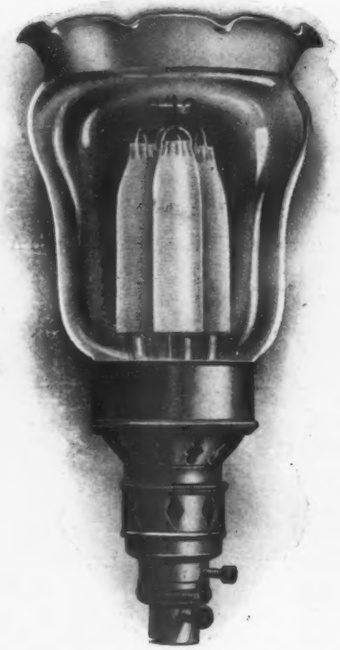

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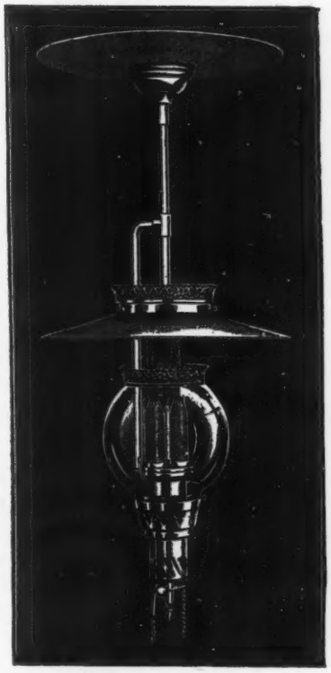

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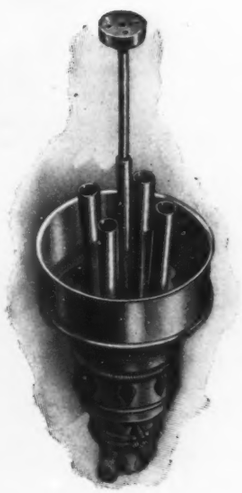

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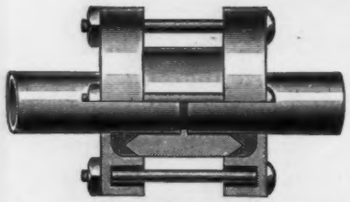
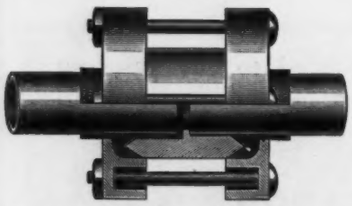
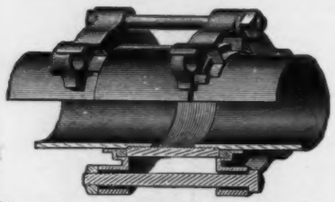


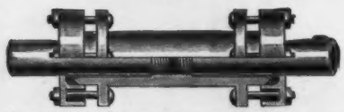
Regular Coupling, Style 1, for Plain End Wrought Iron Pipe.



Insulating Coupling, Style 5, for Plain End Wrought Iron Pipe,



Clamp, Style 4, for Repairing Leaks on Screw Collar.



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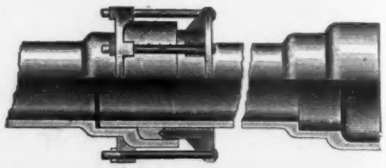
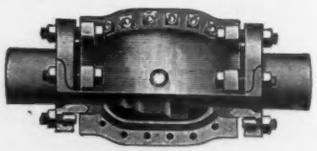
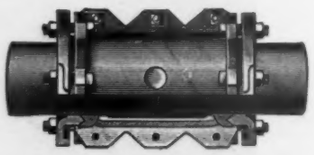


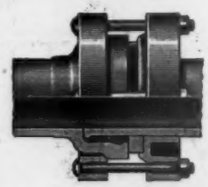
Coupling, Style 9, for Special Style Cast Iron Pipe.



Split Sleeve for Repairing Broken Bell on Cast Iron Pipe.



Split Sleeve for Repairing Broken or Cracked Cast Iron Pipe.



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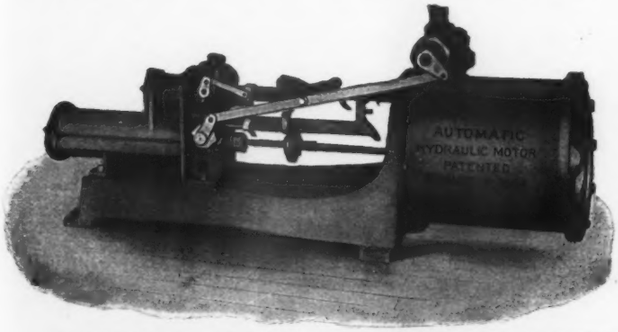

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HEAT PROOF AND DAMP PROOF PAINTS

For Structural Iron and Steel, Gas Apparatus, Underground Piping, Boiler Fronts, Stacks, etc.

Our Paints will not crack, peel or scale. Heat does not affect them. They are moisture proof.

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Cook with the half of it.

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Divides in the middle. No nuts, bolts or screws.

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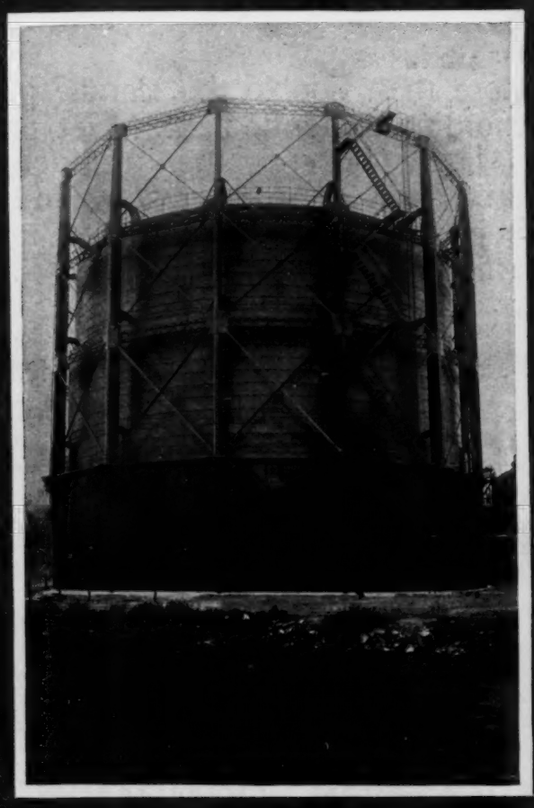

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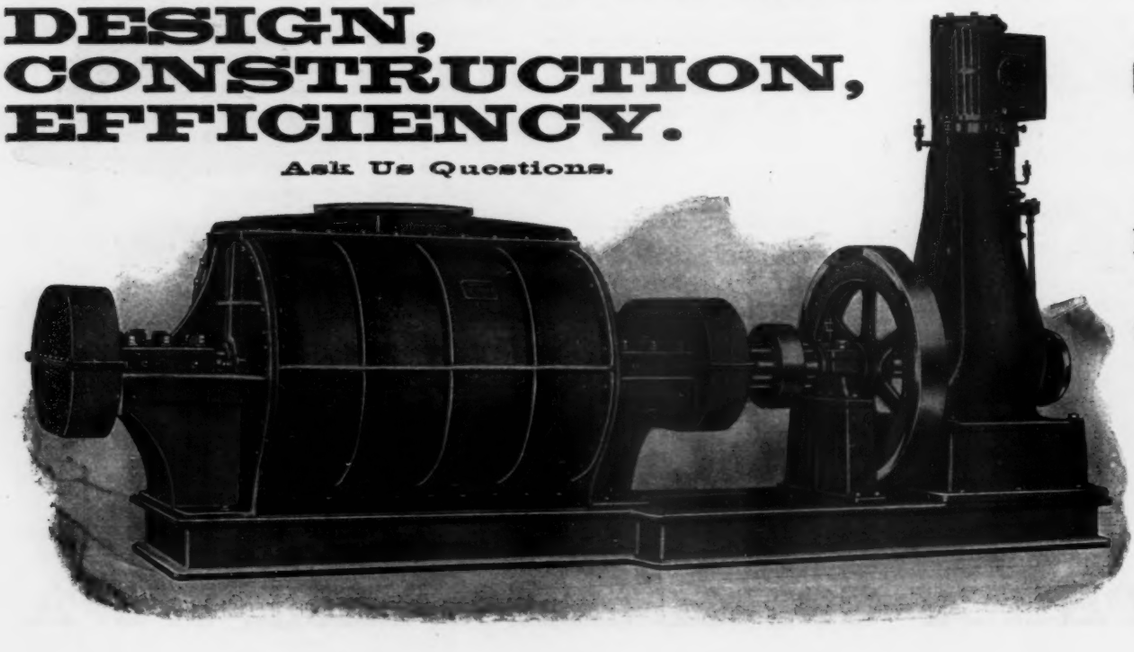

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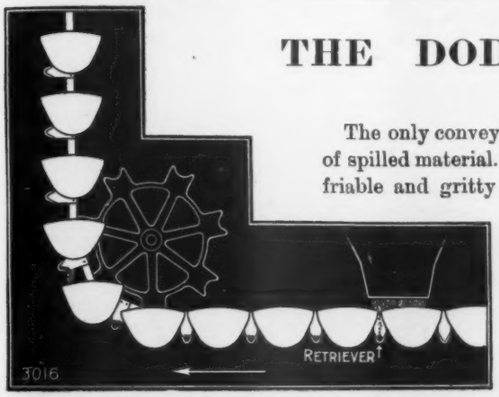

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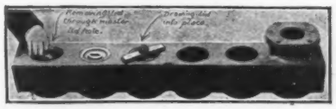

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Mueller Pipe Jointers are made for all sizes of cast iron pipe from 2 to 48 inches. The illustrations show the jointer closed as upon the pipe and open as ready to put on.

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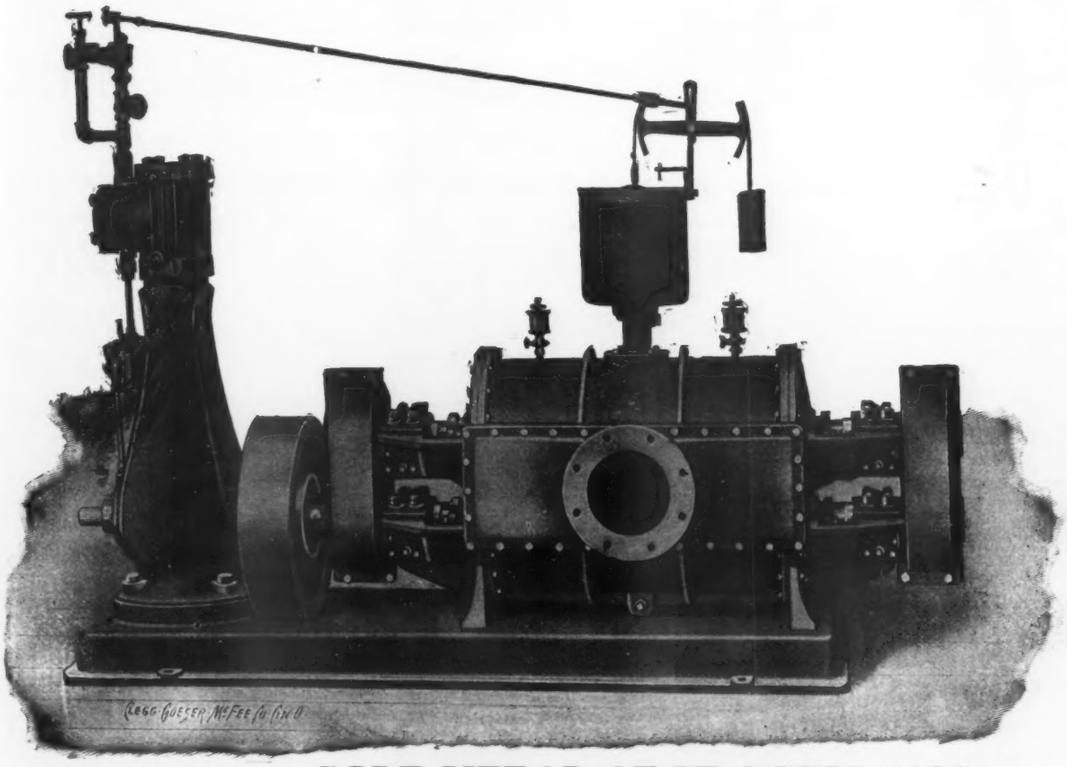

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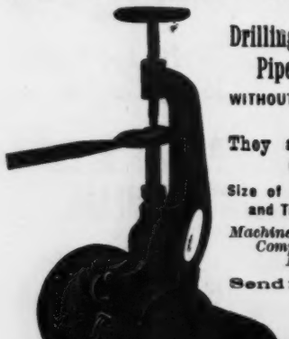

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Machines Sent to any Gas Company for Thirty Days' Trial.

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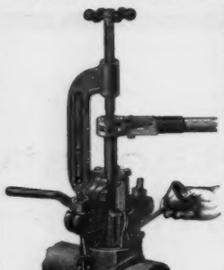

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For Shutting Off Gas in Mains

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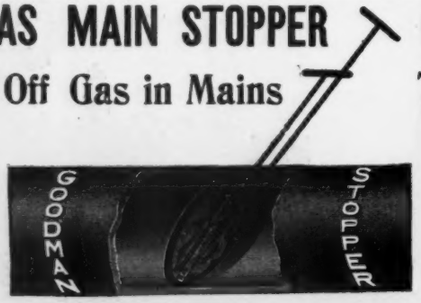

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Or any heavy or gritty materials, where strength and durability are essential. Constructed in any length or capacity, and to suit local conditions.

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PUBLIC LIGHTING TABLE.

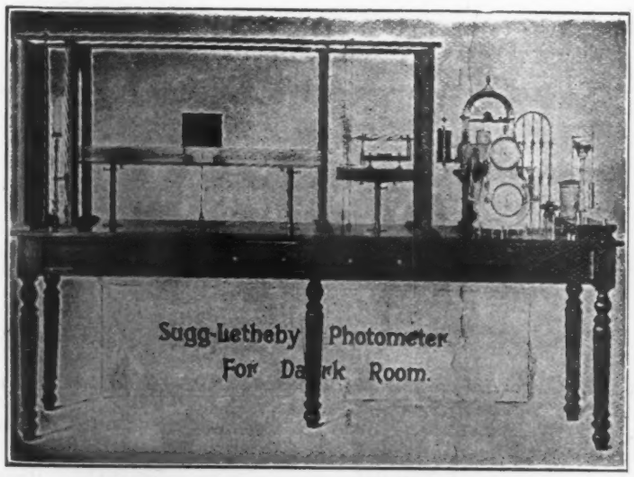
DECEMBER, 1905.

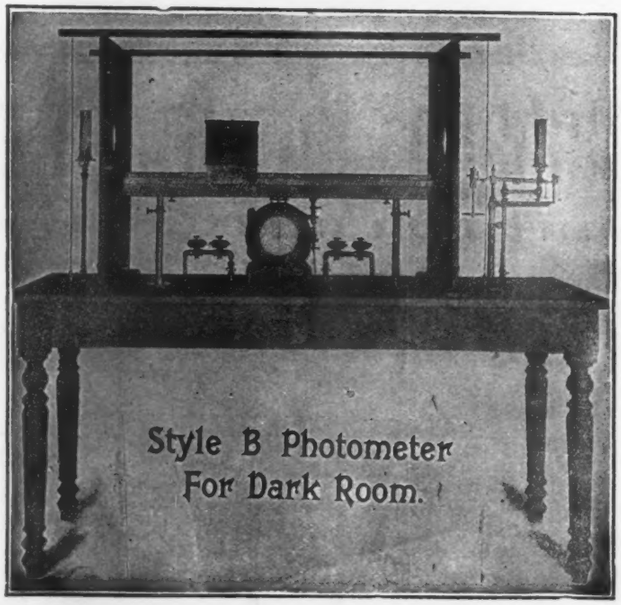
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Fri.	1	9.00 PM	6.00 AM
Sat.	2	10.00	6.00
Sun.	3	11.00 FQ	6.10
Mon.	4	12 00	6.10
Tue.	5	12.50 AM	6.10
Wed.	6	1.50	6.10
Thu.	7	2.40	6.10
Fri	8	3.40	6.10
Sat.	9	4.40	6.10
Sun	10	No L.	No L.
Mon.	11	No L. FM	No L.
Tue.	12	No L.	No L.
Wed.	13	5.00 PM	7.20 PM
Thu.	14	5.00	8.20
Fri.	15	5.00	9.20
Sat.	16	5.00	10.20
Sun.	17	5.10	11.20
Mon.	18	5.10	12.30 AM
Tue.	19	5.10 LQ	1.40
Wed.	20	5.10	2.50
Thu.	21	5.10	4.00
Fri.	22	5.10	6.20
Sat.	23	5.10	6.20
Sun.	24	5.10	6.20
Mon.	25	5.10 NM	6.20
Tue.	26	5.10	6.20
Wed.	27	5.10	6.20
Thu.	28	5.10	6.20
Fri.	29	5.10	6.20
Sat.	30	8.40	6.20
Sun.	31	9.40	6.20

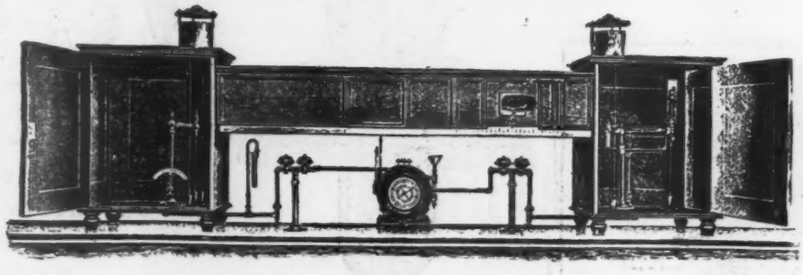
TOTAL HOURS DURING 1905.

By Table No. 1.

	Hrs.Min.
January	240.50
February	192.20
March	207.00
April	175.10
May	161.00
June	139.50
July	149.00
August	161.50
September	173.00
October	205.00
November	211.00
December	229.00
Total, yr.	2245.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

DECEMBER, 1905.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
		P. M.	A.M.
Fri.	1	4.20	6.10
Sat.	2	4.20	6.10
Sun.	3	4.20	6.15
Mon.	4	4.20	6.15
Tue.	5	4.20	6.15
Wed.	6	4.20	6.15
Thu.	7	4.20	6.15
Fri.	8	4.20	6.15
Sat.	9	4.20	6.15
Sun.	10	4.20	6.20
Mon.	11	4.20	6.20
Tue.	12	4.20	6.20
Wed.	13	4.20	6.20
Thu.	14	4.20	6.20
Fri.	15	4.20	6.20
Sat.	16	4.20	6.20
Sun.	17	4.20	6.20
Mon.	18	4.20	6.20
Tue.	19	4.20	6.20
Wed.	20	4.20	6.20
Thu.	21	4.20	6.20
Fri.	22	4.20	6.20
Sat.	23	4.20	6.20
Sun.	24	4.20	6.25
Mon.	25	4.20	6.25
Tue.	26	4.20	6.25
Wed.	27	4.20	6.25
Thu.	28	4.20	6.25
Fri.	29	4.20	6.25
Sat.	30	4.20	6.25
Sun.	31	4.20	6.25

TOTAL HOURS DURING 1905.

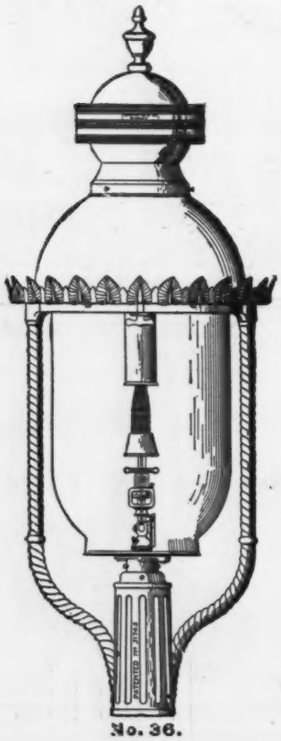
By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 318 West 42d Street. BOSTON, 820 Beacon Building. PHILADELPHIA, Broad and Arch Streets. ST. LOUIS, 712 Roe Building. CHICAGO, 218 La Salle Street. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

The Welsbach No. 6 Harp Fixture.

AN IDEAL LIGHT FOR DINING OR LIVING ROOMS.

THE HIGHEST MECHANICAL INGENUITY COMBINED WITH ORNAMENTAL BEAUTY--THE NEWEST OUTPUT FROM THE WELSBACH FACTORIES.

Equipped with new model No. 66 high candle power Welsbach Burner.

Side Pilot By-pass Tube covered with refractory sleeve to prevent bending.

Fourteen-Inch Opal Dome Shade.

Polished Brass Embossed Crown 2¼ inches high.

Length of Fixture, 30 inches.

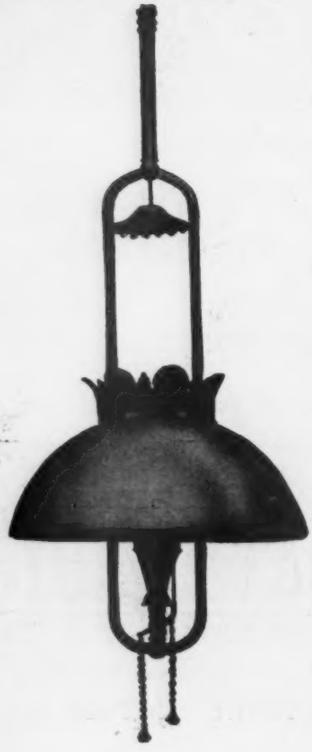
Width of Harp, 4½ inches.

Finished in Polished Brass.

Packed One Dozen to the Case.

List Price, per Dozen, $45 00.

We recommend equipping the No. 6 Harp Fixture with No. 4197 Intensive Brand Mantle, and the No. 306 **F. Q. M.** Clear Glass Air-Hole Cylinder.



Although the 14-inch Opal Dome Shade is standard equipment, we are prepared to furnish Dome Shades in green, pink or yellow (opal lined), and will be glad to quote prices.

WELSBACH CO.,

Salesrooms in all the principal cities of the United States.

Factories:
GLOUCESTER, N. J.
CHICAGO, ILL.

THE UNITED GAS IMPROVEMENT COMPANY

For the Period Ending July 1st, 1905, has been Awarded Contracts for 32 Sets of

Standard Double-Superheater Lowe Water Gas Apparatus.

PARTIAL LIST OF PLACES:

Catasauqua, Pa.	**Hempstead, N. Y.** (2d contract).	**Amsterdam, N. Y.**
Plattsmouth, Neb.	**Lansdale, Pa.**	**Houston, Tex.** (2d contract).
Detroit, Mich. (2d contract).	**New Britain, Conn.**	**Hamilton, O.** (2d contract).
Springfield, Ills.	**Ludington, Mich.**	**Indianapolis, Ind.** (2d contract).
Oneonta, N. Y. (2d contract).	**New York,** Mutual Co. (2d contract).	**Hazleton, Pa.**
Pottsville, Pa. (2d contract).	**St. Louis, Mo.** (4th contract).	**Mahanoy City, Pa.**
Evansville, Ind. (2d contract).	**Sioux City, Ia.** (3d contract).	**Nanticoke, Pa.**

TOTAL SETS TO JULY 1ST, 1905, ... 585
TOTAL DAILY CAPACITY TO JULY 1ST, 1905, . 455,980,000 CU. FT.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
83 VAN DYKE ST., BROOKLYN, N. Y.
MANUFACTURERS OF

CLAY GAS RETORTS & SETTINGS, GENERATOR LININGS. SPECIALTIES.

ST. LOUIS GAS CONSTRUCTION CO.,

DESIGNERS AND BUILDERS OF

COAL GAS BENCHES,

SPECIAL HIGH GRADE REFRACTORY MATERIAL FOR BENCH SETTINGS AND WATER GAS LININGS.

SOLE AGENTS FOR

CHRISTY SETTINGS.

CORRESPONDENCE SOLICITED.

ST. LOUIS, MO.

FIELD'S ANALYSIS FOR THE YEAR 1904.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland. Being the 36th year of publication. Compiled and arranged by JOHN W. FIELD, Sec'y and Gen. Mgr. of The Gas Light and Coke Company, London. Price, $5. For Sale by
A. M. CALLENDER & CO., 42 Pine St., New York City.

ALBERT J. WEBER, President and General Manager.
Established 1846.

Adam Weber Sons.

Manhattan Fire Brick and Enameled Fire Clay Retort Works.

Works at Weber, on the Raritan River. Middlesex County, New Jersey.

GENERAL OFFICES:
Park Row Building, New York City.

Modern Coal Gas Benches,

With either Horizontal or Inclined Retorts, Half-Depth and Full-Depth Recuperative Furnaces.

ADAM WEBER PATENTS

STANDARD BENCH IRONWORK.

Linings for Water Gas Apparatus, High Grade Fire Brick of All Shapes and Sizes, Ground Fire Clay, Ground Fire Brick in Bulk or in Barrels.

ISAAC C. BAXTER, President.
Works.
LOCKPORT STATION, PA.

ESTABLISHED 1864.

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Successor to WILLIAM GARDNER & SON.

PETER YOUNG, Secretary and Treas.
Address all communications to
JAMES GARDNER, JR., CO., Room 202 Lewis Bldg
PITTSBURGH, PA.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT.

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. PITTSBURGH, PA.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 300 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD,
1200 Bank for Savings Bldg., Pittsburgh, Pa.

NATIONAL PYROGRANIT COMPANY,

MANUFACTURERS OF

Fire Brick, Tiles, Special Shapes, etc.

NEW YORK OFFICE:
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WORKS:
South River, N. J.

ESTABLISHED 1868.

L. N. RANCKE, Vice-Pres. & Mgr. F. SCHIAFFINO, Sec'y & Treas.

BALTIMORE RETORT & FIREBRICK CO.

BALTIMORE, MD.,

Manufacturers of all Material for the Construction of Coal Gas Benches.

HALF AND FULL DEPTH AND FREE FIRING BENCHES,

All styles of which we have in operation equipped with the BEST of LATEST IMPROVEMENTS, proving our claim for SUPERIOR QUALITY and EFFICIENCY.

INCLINES—We have in SUCCESSFUL OPERATION benches of Inclined Retorts, MANUFACTURED and ERECTED by us.

WALDO BRO., 102 MILK ST., BOSTON MASS.,
Agents for New England States.

LARGE FACILITIES—Correspondence Solicited.
RAIL and WATER CONNECTIONS to ALL POINTS.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office: *411 Olive Street, Continental Bank,* ST. LOUIS, MO.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada.

Four-Scoop and Four-Rake Charging and Discharging Machines are operating in Detroit, Mich.

These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

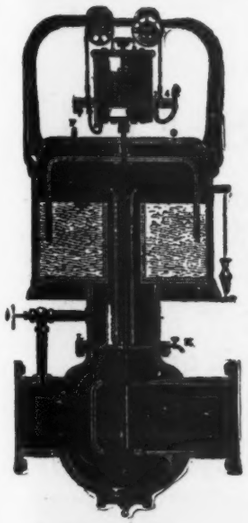
Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

G. A. BRONDER,

Contracting Engineer and Builder,

229 BROADWAY, NEW YORK.

CONNELLY IRON SPONGE AND GOVERNOR CO.,



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COAL OR WATER GAS PLANTS,

Automatic, Balance, High Pressure and Service Governors,

Roots Improved Gas Exhausters,

Iron Sponge, Purifying Material for Gas Purification Jones Jet Photometers Pressure Registers, etc.,

INSTALLATION OF SMOKELESS TAR BURNING SYSTEM,

Reinforced Concrete Construction for all Purposes,

Wide Experience in High Pressure Installation and Extension,

GAS SPECIALTIES.

395 Broadway, NEW YORK.

295 West 22d Street, CHICAGO, ILLS.

FIELD'S ANALYSIS

For the Year 1904.

An Analysis of the Principal Gas Undertakings in England, Scotland and Ireland. Being the 36th Year of Publication.

COMPILED AND ARRANGED BY **JOHN W. FIELD,**

Secretary and General Manager of The Gas Light and Coke Company, London.

PRICE, $5. FOR SALE BY

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1905 DIRECTORY 1905

OF AMERICAN GAS COMPANIES.

Price, - - - - - - - - $5.00.

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THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

Ocean Mine Youghiogheny Gas Coal,
Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK, PHILADELPHIA, BALTIMORE AND NORFOLK.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
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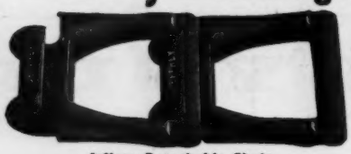
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming. .

A. C. M. AZOY, General Agent, 1 Broadway, New York.

Jeffrey Elevating-Conveying Machinery



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COAL, COKE, ETC.

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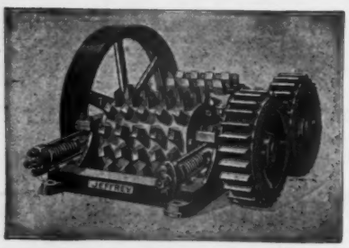
Shaking Screens, Dump Cars, Power Transmission Machinery, Chains, Elevator Buckets, Sprocket Wheels, Crushers, Screens, Cable Conveyors, Spiral Conveyors, Etc.



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ENGINEERS AND BUILDERS OF GAS PLANTS.

Inclined Benches, own system, Recuperative Furnaces, Exhausters, Exhauster Governors, Condensers, Washers, Coolers, Wet Purifying Plants, Purifiers, Oxide Elevators, Hydraulic and Dry Coke Conveyors.

Special High Grade Material for Recuperative Furnaces.

Licensees for ARROLL-POULIS Charging and Discharging Machines and FRONHAUSER Coke Conveyors. OFFICE, 405 KEENE ST., MILWAUKEE, WIS.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

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Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid

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GAS MACHINERY.

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Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

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Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas giving qualities, and in freedom from sulphur and other impurities.

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PRODUCER, REFINER, SHIPPER AND EXPORTER OF Petroleum and All Its Products.

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THE SUN OIL CO.

Gas Oil, Gas Naphtha,
Refined Oil, Lubricating Oils.

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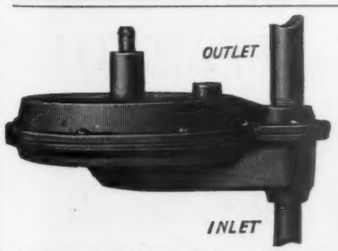

REYNOLDS HIGH PRESSURE GAS GOVERNORS.

Our Governors Reduce 30 or 40 Pounds Pressure to 2 Inches Water Pressure.

WE MAKE ALL SIZES OF

DOUBLE DISTRICT GOVERNORS, INDIVIDUAL HOUSE SERVICE AND LOW PRESSURE GOVERNORS.

Write for Catalogue and State what you Need.

JOHNSON-REYNOLDS CO.,
ANDERSON, IND., U. S. A.

Standard Oil Company,

GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

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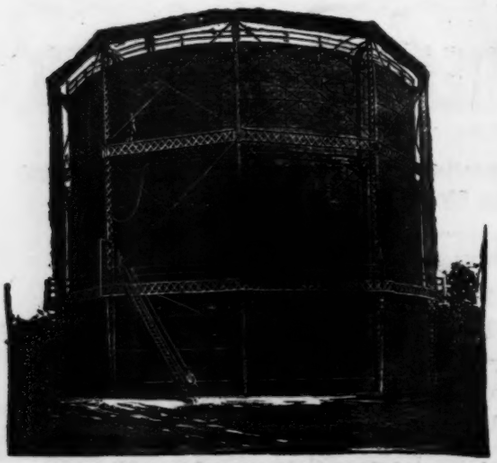

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Principal Office and Works, Waltham, Mass.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS AND STEEL TANKS,

Latest Improved

ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

Street Specials and Valves.

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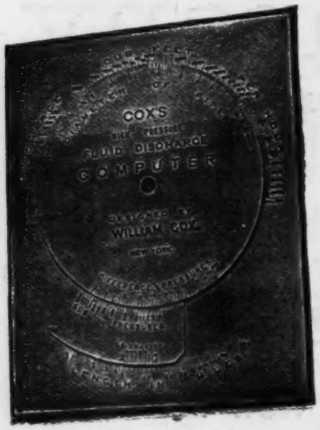


COX'S HIGH-PRESSURE FLUID DISCHARGE COMPUTER.

This Computer solves the following formula, which is applicable to Gas, Air and other elastic fluids, flowing through long pipes with high initial pressures:

$$\text{Discharge in cubic feet per hour at atmospheric pressure} = 33.3\sqrt{\frac{d^5 \times (p_1^2 - p_2^2)}{L \times w}}$$

Where d = diameter of pipe in inches,
p_1 = absolute initial pressure in pounds per square inch,
p_2 = absolute terminal pressure in pounds per square inch,
L = length of pipe in miles,
w = specific gravity of the fluid when air = 1.

To Find the Discharge from a Pipe and the Required Size of Pipe.

(1.) Set the specific gravity of the fluid opposite the length of pipe;
(2.) Bring the DIFFERENCE of the initial and terminal gauge pressures opposite the SUM of the initial and terminal gauge pressures;
(3.) Opposite any diameter of pipe will now be found the discharge in cubic feet per hour at atmospheric pressure; and
(4.) Opposite any desired discharge will also be found the required diameter of pipe.

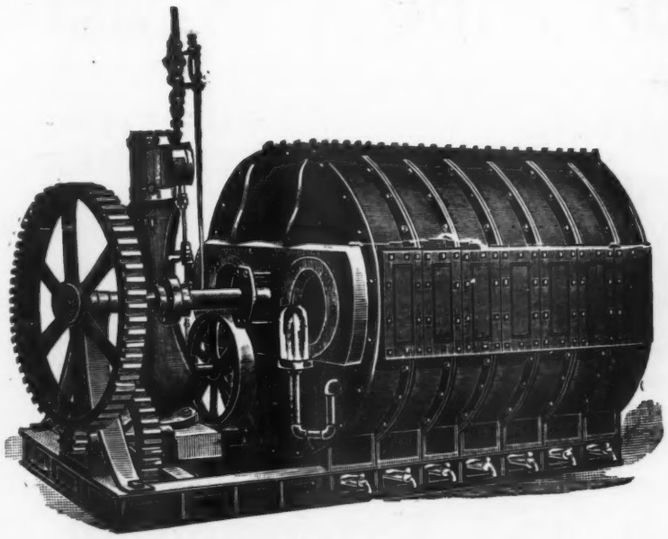
Price of the Computers, in Cloth Case, 6½ x 8 inches, $5 Each, Net.

A. M. CALLENDER & CO., 42 PINE ST., N. Y.

BARTLETT, HAYWARD & CO.

BALTIMORE, MD.

Designers and Builders of Gas Works.



Sole Lessees the Wilkinson Water Gas Process.

PATENT STANDARD WASHER-SCRUBBER.

The best apparatus for the extraction of all Ammonia and a large proportion of Carbonic Acid and Sulphureted Hydrogen. The Scrubber has been materially improved and is provided with patented Wooden Segmental Grids, instead of Metallic Disks, thus reducing the weight on shaft and power for operating same.

Coal and Water Gas Installations of the Most Modern and Complete Types.

BENCHES WITH INCLINED RETORTS.

System Stettiner Chamotte Fabrik, Actien Gesellschaft, of Stettin, Germany.

GASHOLDERS OF ALL SIZES.

General Western Agents, THE LLOYD CONSTRUCTION CO., of Detroit, Mich.

QUINTARD IRON WORKS,

N. F. PALMER,

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GAS APPARATUS.

Complete Works Erected.

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CONSULTING ENGINEERS.

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New York.

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England.

ADVICE AS TO EXTENSION AND RECONSTRUCTION OF GAS AND ELECTRICITY PLANT.

COMPLETE EXAMINATIONS MADE.
PROPERTIES PURCHASED.

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400 CHESTNUT ST., PHILADELPHIA,

MANUFACTURERS OF

Cast Iron Pipe.

HEAVY LOAM CASTINGS,

Dunham Specials,

Hydraulic Work,

LAMP POSTS, VALVES, ETC.,

Gas Power Plants with Producers.

BUILDERS OF

Gasholders.

Single or Multiple Lifts, with or without Metal Tanks.

PURIFIERS, CONDENSERS, SCRUBBERS, BENCH WORK.

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J. S. DE HART, JR. President. R. K. WEHNER, Treasurer. A. F. WEHNER, Secretary

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ENGINEERS AND CONTRACTORS FOR THE

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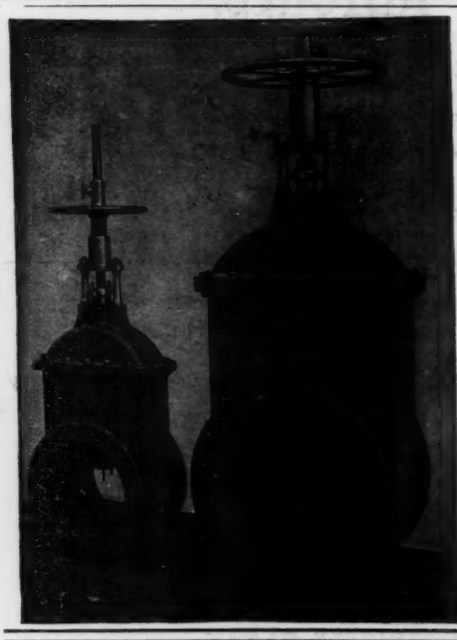

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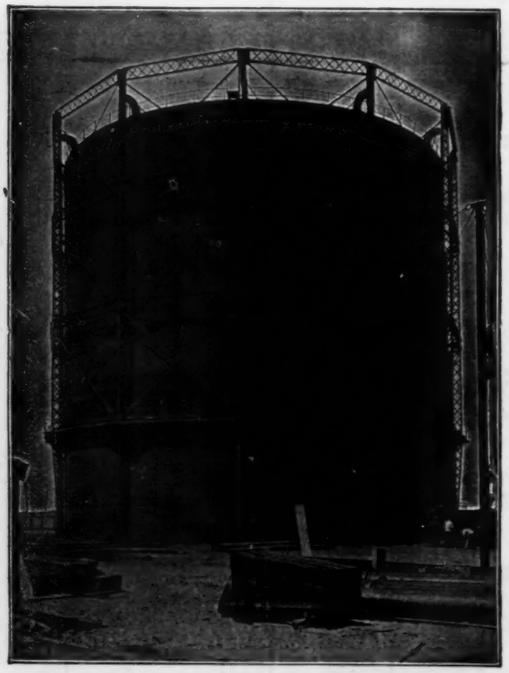

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